

---

JOURNAL  
OF THE  
ARNOLD ARBORETUM

---

VOL. XXIII

JULY, 1942

NUMBER 3

---

## PLANTAE PAPUANAE ARCHBOLDIANAE, IX

E. D. MERRILL AND L. M. PERRY

*Concluded from page 265*

*C. Flowers smaller, less than 8 mm. in diameter immediately below the calyx-lobes.*

*E. Calyx-lobes unequal, the outer a little smaller than the inner, 2-5 mm. long.*

*F. Inflorescence lateral.*

***Syzygium dictyophlebium* sp. nov.**

Arbor gracilis circiter 16 m. alta; ramulis teretibus vel leviter compressis cinereo-fuscis; foliis tenuiter coriaceis consperse pellucido-punctatis manifeste reticulatis in sicco brunneo-viridibus ellipticis, 8.5-15 cm. longis, 4.5-7 cm. latis, basi rotundato-cuneatis decurrentibus, apice recurvatis abrupte breviter obtuse acuminatis, acumine  $\pm$  5 mm. longo, costa supra impressa subtus elevata, nervis primariis subirregulariter dispositis compluribus tantum paullo quam secundariis ac reticulo prominulioribus late patentibus fere subtransversis in venam intramarginalem  $\pm$  3 mm. a margine confluentibus, interdum vena intramarginali secundaria cum primaria subparallela disposita; petiolo 1-1.3 cm. longo basim versus margine adpresso; inflorescentiis apice ramulorum brevium (20 cm. longo) quam caeteris crassiorum (7-9 mm. diametro) ramosis usque 8 cm. longis ac 15 cm. latis; floribus non visis; fructibus albis crebre glandulosis immaturis depresso globosis (1.3 cm. diametro), basi 1 mm. stipitatis, apice calycis lobis coronatis; lobis inaequalibus rotundatis exterioribus brevioribus, interioribus circiter 3 mm. longis.

BRITISH NEW GUINEA: Central Division, Mafulu, *Brass* 5338 (TYPE), October 1933, alt. 1250 m., limestone forest (slender tree about 16 m. high; pale brown scaly bark; numerous panicles of white glandular fruit on old wood below the leaves).

***Syzygium insculptum* sp. nov.**

Arbor parva 6 m. alta; ramulis acute tetragonis fulvis; foliis coriaceis impellucidis supra viridibus subtus pallidioribus manifeste laxe reticulatis oblongo-ellipticis, 24-37 cm. longis, 9.5-14 cm. latis, basi cuneatis vel obtusis apice acuminatis, acumine  $\pm$  2 cm. longo, margine anguste recurvatis, costa supra canaliculata, subtus elevata, nervis primariis utrinsecus 17-25 patenti-adscendentibus in venam intramarginalem perspicuam

4 mm. a margine remotam conjunctis, supra insculptis subtus perspicuis; petiolo  $\pm$  8 mm. longo, 3 mm. crasso atrofusco; inflorescentiis e nodis defoliatis ortis interdum axillaribus; paniculis fasciculatis; rhachi usque 4 cm. longa ramulisque tetragonis interdum anguste alatis; floribus sessilibus basi bibracteatis, bracteis oblongis  $\pm$  3 mm. longis caducis; alabastris nitidis 9–10 mm. longis; calycis tubo pyriformi in sicco 7 mm. longo, 5–6 mm. diametro circumcirca manifeste costato, venis 12 fere ad apicem loborum adscendentibus, lobis 4 circiter 2 mm. longis 4 mm. latis valde concavis.

BRITISH NEW GUINEA: Fly River, 528 mile Camp, *Brass 6681* (TYPE), May 1936, alt. 80 m., undergrowth small tree in a gully (6 m. high; leaves stiff, glossy, with deeply impressed nerves and prominent marginal vein; numerous lateral fascicles of unopened white flowers).

This species should be compared with *Syzygium rubropunctatum* (Ridl.) comb. nov. (*Eugenia rubropunctata* Ridl. Trans. Linn. Soc. Bot. II. 9: 46. 1916). The leaves have like characters and the inflorescences are lateral. The flowers are only in bud but they are twice the size of those described by Ridley and have dried in a regular pattern with 12 narrow ridges about 0.5 mm. broad almost evenly distributed, four extend almost to the apex of the lobes in the position of the midrib, between each two of these are two more, slightly less prominent, which part below the base of the adjacent lobes, one going to each lobe. In Ridley's species the calyx is described as rugose when dry.

***Syzygium Lauterbachianum* nom. nov.**

*Syzygium floribundum* Lauterb. & K. Schum. in K. Schum. & Lauterb. Fl. Deutsch. Schutzgeb. Südsee 476. 1900, non F. v. Muell. (1864).

*Jambosa floribunda* (Lauterb. & K. Schum.) Diels, Bot. Jahrb. 57: 388. 1922.

BRITISH NEW GUINEA: Gaima, Lower Fly River (east bank), *Brass 8273*, November 1936, on tidal foreshores (fresh water) (compact tree 5–6 m. high; flowers cream-colored, fragrant; flower-buds brown); Lower Fly River, east bank opposite Sturt Island, *Brass 8211*, October 1936, rain-forest on low river banks (common tree 10–15 m. high with rather open leafage and striking reddish bark; flowers white, shining smooth brown in the bud).

These collections agree very well with the original description and, as Diels has already pointed out, are very near *Eugenia Tierneyana* F. v. Muell.

***Syzygium Lauterbachianum* var. *phaeophloium* var. nov.**

A forma typica differt venis foliorum primariis arcuatim 5–9 mm. a margine remotis confluentibus, vena submarginali secundaria cum primaria subparallela disposita; calycis tubo basi 2–3 mm. stipitato supra subabrupte circiter 5 mm. campanulato-obconico.

SOLOMON ISLANDS: Bougainville: Kieta, *Kajewski 1543*, March 1930, rain-forest, on fresh water creek banks (tree up to 30 m. high; fruit dark red plum color when ripe, 2 cm. long, 1.7 cm. diameter). Guadalcanal: Mamassa, Konga, *Kajewski 2491*, February 1931, alt. 400 m., common on banks of creeks and rivers in rain-forest (tree up to 25 m. tall; bark brown; petals cream touched with pink; very strong wood); Sorvorhio Basin, *Kajewski 2703*, January 1932, alt. 300 m., rain-forest (tree up to 30 m. with brown flaky bark; petals pink and white outside, white inside; stamens white; wood heavy). San Cristobal: Magoha River, *Brass 2752*, August 1932, common in rain-forests of coast hills (tree up to 30 m. tall with compact crown; bright reddish brown bark peeling in very thin papery flakes; flowers white.



A very conspicuous species). Y s a b e l : Garona, *Brass* 3371 (TYPE of var.), lowland rain-forests (large tree with reddish bark peeling in thin papery flakes; leaves dull, paler beneath; flowers white).

In the Solomon Islands material the primary veins are arcuately confluent well within the margin forming a remotely crenate submarginal vein, while closer to the margin and more or less parallel is a fainter secondary vein. The flowers are turbinate rather than clavate; nevertheless there is so much similarity between the New Guinea and the Solomon Islands material that we do not at present regard them as specifically distinct.

*Syzygium malaccense* (Linn.) Merr. & Perry, Jour. Arnold Arb. **19**: 215. 1938; Mem. Am. Acad. Sci. **18**: 154 (Mem. Gray Herb. **4**: 154). 1939.

*Eugenia malaccensis* Linn. Sp. Pl. 470. 1753.

BISMARCK ARCHIPELAGO: New Britain: Siwai, *Waterhouse* 102, 110, 200; Gazelle Peninsula, *Waterhouse* 254. SOLOMON ISLANDS: Bougainville: Kugumaru, Buin, *Kajewski* 1814, June 1930, alt. 150 m., rain-forest. Malaita: Quoi-monapu, *Kajewski* 2322, December 1930, alt. 50 m., rain-forest. San Cristobal: Huro River, *Brass* 2602, August 1932, lowlands. Y s a b e l : Sigana, *Brass* 3464, January 1933, alt. 20 m., bed of a small rocky creek.

The field notes indicate a large tree with short flanged trunk, brown flaky bark, very showy pink short inflorescences on the branches, pink fruit up to 6 cm. long, 4 cm. diameter, with a crisp subacid flavor. A species growing wild and also planted in native villages.

*Syzygium multiglandulosum* sp. nov.

Arbor  $\pm$  30 m. alta; ramis ramulisque subteretibus brunnescentibus; foliis chartaceis vel tenuiter coriaceis crebre pellucido-punctatis in sicco supra olivaceis subtus leviter pallidioribus oblongo-ellipticis vel ellipticis, 7-12 cm. longis, 3.5-5.5 cm. latis, utrinque subrotundatis deinde basi breviter cuneatis apice recurvato-falcatis acuminatis margine vix recurvatis, costa supra canaliculata subtus prominente, nervis primariis patentiadscendentibus utrinsecus  $\pm$  12 utrinque prominulis in venam intramarginalem 5 mm. a margine confluentibus, vena submarginali secundaria circiter 1 mm. a margine remota, venulis prominulis reticulum crebrum efformantibus cum nervis primariis subparallelum; petiolo 1-1.5 cm. longo; inflorescentiis non visis; fructibus subglobosis  $\pm$  4 cm. diametro calycis lobis 4 (rotundatis  $\pm$  1 cm. longis rigidis) coronatis; pericarpio 5 mm. crasso.

NETHERLANDS NEW GUINEA: 2 km. southwest of Bernhard Camp, Idenburg River, *Brass & Versteegh* 13194 (TYPE), March 1939, alt. 850 m., frequent on slopes in primary rain-forest (tree 30 m. high, 42 cm. diameter; bark red, scaly; fruit green); 6 km. southwest of Bernhard Camp, Idenburg River, *Brass & Versteegh* 12548, February 1939, alt. 1150 m., frequent in primary forest (tree 30 m. high, 67 cm. diameter; bark scaly, red; young fruit green, ripe ones dark red); Bernhard Camp, Idenburg River, *Brass & Versteegh* 13577, occasional in primary forest (tree 27 m. high, 51 cm. diameter; bark 11 mm. thick, red-brown, scaly).

This species closely resembles *Syzygium phaeostictum* Merr. & Perry in habit. There is, however, a very distinct difference in the venation of the leaves. In the former, the secondary venation is very close, the main veins of the reticulum tending to be parallel with the primary nerves. In the latter, the secondary venation is less marked and more open, the veins of the reticulum meeting the primary ones at various angles. In both the

leaves are copiously punctate and have a recurving apex, and both species have a lateral inflorescence.

The label of no. 12548 indicates that the fruits were separated from the foliar specimen. Unfortunately, there was an error in the labelling, and the only fruits we could find which might belong to the specimen are two about 5.5 cm. diameter and a little bit longer. This has a single seed 3.5–4 cm. diameter. On account of the number on the packet not matching the foliar specimen, we have hesitated to include this larger sized fruit in our description, but we feel reasonably sure it belongs with this species.

***Syzygium phaeostictum* sp. nov.**

Arbor  $\pm$  40 m. alta; ramis cinereis; ramulis compressis fulvis glandulosis; foliis chartaceis utrinque reticulatis crebre glanduloso-puncticulatis in sicco supra olivaceis subtus pallidioribus, oblongo-ellipticis, 7–12 cm. longis, 3–4.5 cm. latis, utrinque sensim rotundatis deinde basi breviter cuneatis vel acutis apice acuminatis (apice acuminato recurvo habitu in speciminibus siccis plerumque falcato), margine leviter recurvatis, costa supra interdum paullo canaliculata subtus prominente, nervis primariis subirregulariter dispositis utrinque prominulis utrinsecus 7–10 patentiadscendentibus  $\pm$  4 mm. a margine arcuatim confluentibus, vena submarginali secundaria 1–1.5 mm. a margine remota, venulis prominulis reticulum laxius irregulare cum venis primariis haud parallelum; petiolo 1–1.5 cm. longo; paniculis e nodis defoliatis ortis 4–6 cm. longis latisque; floribus  $\pm$  5 mm. pedicellatis vel interdum sessilibus; calycis tubo turbinato 8 mm. longo (incl. basi 1–1.5 mm. stipitato) apice circiter 6–8 mm. diametro, lobis 4 late rotundatis exterioribus 2 mm. longis interioribus paullo longioribus; petalis 5 mm. longis rotundatis; staminibus 1.5–2 cm. longis, antheris  $\pm$  1 mm. longis; fructibus ignotis.

NETHERLANDS NEW GUINEA: 15 km. southwest of Bernhard Camp, Idenburg River, Brass & Versteegh 11935 (TYPE), 11941, January 1939, alt. 1630 m. and 1600 m., frequent in rain-forest of slopes (large canopy tree 31–41 m. tall; bark grey, scaly; flowers red, white, and pink).

This species has some features in common with the descriptions of ***Syzygium alutaceum*** (Diels) comb. nov. (*Jambosa alutacea* Diels, Bot. Jahrb. 57: 386. 1922) and ***Syzygium daphnoides*** (Greves) comb. nov. (*Eugenia daphnoides* Greves, Jour. Bot. 61: Suppl. 15. 1923). But, in our species, the flowers are a little larger, and the chartaceous leaves are copiously glandular with the venation equally obvious on both surfaces. The acuminate apices of the leaves are all moderately recurved and somewhat falcate.

***Syzygium roseum* sp. nov.**

Arbor magna; ramis ramulisque cinereo-fuscis teretibus vel compressis; foliis tenuiter coriaceis in sicco olivaceo-viridibus subtus flavo-virentibus consperse minuteque atroglandulosis oblongis vel anguste ellipticis, 5.5–9 cm. longis, 2.5–4.5 cm. latis, basi cuneatis apice recurvatis, breviter obtuseque acuminatis, margine anguste recurvatis, costa supra canaliculata subtus elevata, nervis primariis utrinsecus 5–7 oblique adscendentibus marginem versus gradatim arcuatis confluentibus utrinque inconspicuis; petiolo  $\pm$  1 cm. longo parte inferiore crassiusculo fusco; inflorescentiis e nodis defoliatis ortis 2.5–3 cm. longis, paucifloris, bracteis cito caducis; floribus



post anthesim apice ramulorum solitariis; calycis tubo 8–10 mm. longo (incl. basim stipitatum 1.5–3 mm.) supra obconico-subcampanulato, lobis 4 rotundatis 2.5–3 mm. longis et circiter 3.5 mm. latis; staminibus non visis; stylo  $\pm$  2 cm. longo; fructibus immaturis subglobosis  $\pm$  1.5 cm. diametro calycis lobis coronatis, basi brevissime stipitatis.

BRITISH NEW GUINEA: Western Division, Oriomo River, Wuroi, *Brass 5816* (TYPE), January 1934, alt. 5 m., riverbank rain-forest (heavy boled, large tree with brown rough scaly bark and heavy dark brown wood; past flowering; numerous very young dark pink fruit).

This species is perhaps nearest *Syzygium keroanthum* (Diels) comb. nov. (*Jambosa keroantha* Diels, Bot. Jahrb. **57**: 385. 1922) which, according to Diels's key l. c. 380, has larger axillary and terminal inflorescences, and leaves somewhat prominently nerved. The best characters of this species are perhaps the fairly smooth yellowish tinged leaves with venation (except the midrib) scarcely raised on either surface and tending to be inconspicuous, and the short lateral inflorescences with shortly stipitate obconical to subcampanulate flowers (immature fruits).

*F. Inflorescence terminal.*

*Syzygium Archboldianum* sp. nov.

Arbor parva; ramulis teretibus atrofuscis novellis ad apicem interdum puberulis; foliis chartaceis vel tenuiter coriaceis minute crebreque pellucido-punctatis inconspicue reticulatis ellipticis, 10–17 cm. longis, 5–7 cm. latis, utrinque angustatis basi cuneatis interdum paullo obliquis apice breviter acuminatis margine leviter anguste recurvatis, costa supra canaliculata subtus elevata, nervis primariis utrinsecus 8–12 oblique patentibus 4–7 mm. a margine arcuatim confluentibus; petiolo  $\pm$  1 cm. longo interdum glanduloso-puberulo; paniculis terminalibus subcorymbosis, 8–10 cm. longis, 14–18 cm. latis, basim versus cymoso-ramosis vel breviter pedunculatis, rhachi ramisque leviter, ramulis copiose glanduloso-puberulis; floribus in apice ramulorum solitariis vel ternis pedicellatis, flore centrali sessile vel breviter pedicellato; alabastris turbinato-obconicis usque 1.5 cm. longis apice subglobosis creberrime glandulosis; calycis tubo subclavato 6–7 mm. longo, basi subcylindrico 1 mm. diametro apice vix sub lobis 3–4 mm. diametro, lobis 4 inaequalibus exterioribus subrotundatis 3 mm. longis, interioribus rotundato-oblongis 5 mm. longis; petalis rotundatis circiter 7 mm. longis basi breviter unguiculatis; staminibus 3–3.5 cm. longis, antheris oblongis 1 mm. longis; stylo 3.5–4 cm. longo; fructibus ellipsoideis usque 5.5 cm. longis, 4.5 cm. diametro, apice calycis lobis coronatis, novellis breviter stipitatis, stipite crasso 5 mm. longo, 4 mm. diametro, maturis stipite nullo.

BRITISH NEW GUINEA: Lake Daviumbu, Middle Fly River, *Brass 7753*, September 1936, rain-forest substage (tree 15 m. high; fruit green, slightly rugose,  $\pm$  3 cm. diameter); Lower Fly River east bank opposite Sturt Island, *Brass 8126* (TYPE), October 1936, muddy river-banks in rain-forest (small tree; flowers white, fragrant); Gaima, Lower Fly River (east bank), *Brass 8334*, November 1936, common in rain-forest substage (tree 10 m. high; fruit red, up to 5.5 cm. long, 4.5 cm. diameter).

Although neither of the numbers in fruit were collected at the same place as the flowering material, in as far as it is possible to match flowers and fruits in the herbarium, we believe the three collections represent a single species. All have the minute glandular puberulence on the new branches

and the petioles, although the branchlets of the infructescence do not show it to the same degree as when in the flowering stage. The fruit has the same kind of a glandular surface that is found in the flower.

Among New Guinea species this closely approaches *Syzygium dolichostylum* (Diels) comb. nov. (*Jambosa dolichostyla* Diels Nov. Guin. 14: 91. 1924) but the leaves in *Brass* 8126 are a little larger with a few more primary veins, the bracts of the inflorescence have already fallen, and in Diels's description there is no indication of the copious glandular puberulence which covers the branchlets of the inflorescence in this species. The latter feature suggests the Philippine *Eugenia cinnamomea* Vidal and *E. Williamsii* C. B. Robinson but the New Guinean collection is scarcely identical with either. Further, it does not seem to be *E. cinnamomea* var. *novoguineensis* Greves for in that the reticulum of the leaves is prominent on the lower surface.

*Syzygium caudiferum* sp. nov.

Arbor parva gracilis 8 m. alta; ramulis cinereis novellis brunnescentibus leviter compressis; foliis chartaceis crebre pellucido-punctatis in sicco supra olivaceis subtus paullo pallidioribus, lanceolato-oblongis vel anguste ellipticis, 7.5–12 cm. longis, 3–4 cm. latis, basi subacuminatis apice leviter acuminatis, acumine 1–2 cm. longo angusto, costa supra impressa subtus leviter elevata, nervis primariis utrinsecus 7–10 patentibus in venam intramarginalem 4–5 mm. a margine confluentibus utrinque manifestis vix prominulis, vena intramarginali secundaria  $\pm$  1 mm. a margine disposita; petiolo vix 1 cm. longo; inflorescentiis brevissimis axillaribus terminalibusque paucifloris (usque 10-floris), rhachi 4–5 mm. longa, ramis verisimiliter nullis; floribus sessilibus subfasciculatis dense minuteque glandulosis; calycis tubo 1 cm. longo basi 4 mm. stipitato sursum 6 mm. subpyriformi, lobis 4 subrotundatis exterioribus 3 mm. interioribus 5 mm. longis, margine scariosis; petalis 5 mm. longis; staminibus 1.5–2 cm. longis; stylo usque 3.5 cm. longo; fructibus immaturis  $\pm$  2 cm. diametro.

BRITISH NEW GUINEA: Palmer River, 2 miles below Black River Junction, *Brass* 7357 (TYPE), July 1936, alt. 100 m., river flood-plain forest sub-stage (virgate small tree 8 m. tall; flowers white; soft white turgid fruit  $\pm$  2 cm. diameter).

Apparently the fruit is quite immature. In some characters the species suggests *Eugenia coalita* Greves. However, the stamens are all distinct and the inflorescence does not appear to have lateral branches, although sometimes there will be clustered in the axil of a leaf the main inflorescence with 6–8 flowers subspicately arranged on a short peduncle, and a single flower or two on another peduncle; the inflorescences are mostly solitary rather than subfascicled.

*Syzygium cinctum* sp. nov.

Arbor 25 m. alta vel ultra; ramulis leviter compressis brunnescentibus; foliis chartaceis vel subcoriaceis inconspicue manifeste reticulatis pellucido-punctatis, subobovato-ellipticis, 15–21 cm. longis, paullo supra medium 6.5–10 cm. latis, apice obtusis vel retusis basi late cuneatis margine anguste revolutis, costa supra subplana subtus carinata, nervis primariis utrinsecus 18–22, supra impressis subtus prominulis inter se 0.9–1.2 cm. distantibus in venam intramarginalem confluentibus; petiolo circiter 6–8 mm. longo;



inflorescentiis terminalibus fere a basi ramosis, 6 cm. longis, 10 cm. latis, ramulis  $\pm$  angulatis compressis, bracteis subrotundatis  $\pm$  2 mm. longis deciduis; floribus terminalibus apice ramulorum pedicellatis, pedicellis  $\pm$  5 mm. longis; calycis tubo subclavato 1 cm. longo, basi 2 mm. apice sub lobis 5 mm. diametro, lobis 4 rotundatis, 3 mm. longis, 4 mm. latis; petalis calyptram alte convexam formantibus caducis; staminibus numerosis, filamentis  $\pm$  1.2 cm. longis in parte inferiore in phalanges plures  $\pm$  connatis, in parte superiore liberis, antheris  $\pm$  0.8 mm. longis; fructibus subovoideis calycis lobis persistentibus coronatis, circiter 1.5 cm. longis, 0.8 cm. diametro.

SOLOMON ISLANDS: Ysa bel: Tiratona., *Brass 3344* (TYPE), December 1932, alt. 600 m., common in mountain forests (pyramidal brown barked tree 25 m. or more tall; leaves pale with sunken nerves; flowers white; ripe fruit smooth, red).

A species readily recognized by the rather distinct and somewhat widely spaced primary venation of the leaves, the roundish bracts of the inflorescence, and the subcoalescence of the stamens showing a distinct tendency to form phalanges. The intramarginal vein is very close to the margin but not yet blended with it. It does, however, suggest an approach to the condition found in *Syzygium cartilagineum* Merr. & Perry where the intramarginal vein seems to coincide with the margin.

*Syzygium delicatulum* sp. nov.

Arbuscula 2-3 m. alta; ramis cinereo-brunnescentibus; ramulis infra teretibus supra tetragonis brunnescentibus; foliis chartaceis pellucido-punctatis laxe reticulatis oblongo-lanceolatis, (11-)16-20 cm. longis, (2-)4-6 cm. latis, basi emarginatis vel subcordatis apice acutiusculis vel breviter acuminatis (apicibus laesis), costa supra canaliculata subtus elevata, nervis primariis utrinsecus 17-22 supra inconspicuis subtus manifestis vix prominulis in venam intramarginalem 4 mm. a margine confluentibus, interdum vena submarginali secundaria 0.5 mm. a margine remota; petiolo 2-3 mm. longo; inflorescentiis 10-13 cm. longis, 7-8 cm. latis, pedunculo 6-7 cm. longo, ramis ramosis; floribus 1-3 in apice ramulorum dispositis sessilibus; calycis tubo  $\pm$  8 mm. longo, basi longe attenuato supra elongato-turbinato, lobis 4 rotundatis, 2-3 mm. longis; petalis circiter 4 mm. longis, rotundatis basi breviter late unguiculatis; staminibus 2-2.5 cm. longis; fructibus  $\pm$  9 mm. longo, 7 mm. diametro, globoso-urceolatis basi stipitatis apice late breviter umbilicatis, calycis lobis  $\pm$  fractis.

SOLOMON ISLANDS: San Cristobal: Waimasi, *Brass 2781* (TYPE), August 1932, alt. 100 m., rain-forest, common (slender straggling tree 2-3 m. tall; very beautiful reddish pink flowering). Guadalcanal: Tutuve Mountain, *Kajewski 2629*, May 1931, alt. 1700 m., in poor rain-forest of higher altitudes (small tree 4-5 m. tall; fruit purple green when ripe, 9 mm. long, 7 mm. diameter).

The second collection has much more acuminate subfalcate leaves than the type but we take the two to be conspecific. Two species are here suggested as possible allies: *Syzygium hylophilum* (Lauterb. & K. Schum.) comb. nov. (*Jambosa hylophila* Lauterb. & K. Schum. in K. Sch. & Lauterb. Fl. Deutsch. Schutzgeb. Südsee 471. 1900), and *Syzygium salomonense* (Hemsl.) comb. nov. (*Eugenia salomonensis* Hemsl. Jour. Linn.

Soc. Bot. **30**: 212. 1894). From the first, *S. delicatulum* differs in having smaller flowers and double the number of primary veins in the leaves, and from the second in the very much shorter inflorescence and the narrowed elongate-turbinate calyx.

***Syzygium discolor* sp. nov.**

?Arbuscula; ramis cinereis; ramulis teretibus brunnescentibus; foliis tenuiter coriaceis impellucidis supra brunnescentibus subtus pallidioribus, oblongis, 4–7.5 cm. longis, 2–3 cm. latis, utrinque paullo angustatis basi cuneatis apice breviter obtuse acuminatis, costa subtus prominente, nervis primariis utrinsecus  $\pm 9$  supra leviter manifestis subtus non prominulis patentibus circiter 3 mm. a margine arcuatim conjunctis; petiolo 3–5 mm. longo; inflorescentiis usque 7 cm. longis terminalibus ramosis, ramis obscurissime puberulis; floribus saepissime pedicellatis; alabastris 1–1.3 cm. longis apice  $\pm 7$  mm. diametro; calycis tubo turbinato 6 mm. longo, stipite 2 mm. incluso, lobis 4 late rotundatis exterioribus 3 mm. interioribus 5 mm. longis; petalis circiter 8 mm. longis singillatim caducis; staminibus 2 cm. longis; fructibus non visis.

NORTHEASTERN NEW GUINEA: Sattelberg, *Clemens* 1760 (TYPE), February 1936, alt.  $\pm 900$  m.

This species seems to be a relative of *Syzygium dolichostylum* (Diels) Merr. & Perry, but the latter has larger leaves with fewer and apparently more prominent primary nerves.

***Syzygium longipes* nom. nov.**

*Eugenia longipes* Warburg, Bot. Jahrb. **13**: 391. 1891; K. Schum. & Lauterb. Fl. Deutsch. Schutzgeb. Südsee 469. 1900; Ridley, Trans. Linn. Soc. Bot. II. **9**: 44. 1916, non Berg (1854).

*Jambosa longipes* Diels, Bot. Jahrb. **57**: 382. 1922.

NORTHEASTERN NEW GUINEA: Heldsbach, *Clemens* 874, November 1935, alt.  $\pm 30$  m. In addition we have the following specimens from British New Guinea which differ chiefly in having slightly larger flowers: Central Division, Kubuna, *Brass* 5606, December 1933, alt. 100 m., riverine rain-forest (tall bush about 3 m. high; branchlets 4-angled; leaves glossy; flowers red). Ridley described the stamens as 1 cm. long; in *Brass* 5606 they are about 2.5 cm. in length.

***Syzygium longipes* var. *leptopodum* (Diels) comb. nov.**

*Jambosa longipes* var. *leptopoda* Diels, Bot. Jahrb. **57**: 383. 1922.

BRITISH NEW GUINEA: Western Division, Fly River, 528 mile Camp, *Brass* 6708, May 1936, alt. 80 m., common in undergrowth or ridge forests (lank near-tree 3–4 m. high; stamens a deep red, other parts of the flower pink); Lake Daviumbu, Middle Fly River, *Brass* 7475, August 1936, rain-forest, the chief constituent of the wood undergrowth (small tree 3–6 m. high, producing numerous pendent panicles of showy red flowers); Central Division, Ononge Road, Dieni, *Brass* 3986, May 1933, alt. 500 m., rain-forest under storey (very slender little tree 2–3 m., inflorescence reddish); Gulf Division, Murua River, *Brass* 1345, March 1926, alt.  $\pm 120$  m., rain-forest (tall bush with dark pink flowers in terminal pendulous panicles).

The variety differs from the species in the longer branches of the inflorescence, the slightly larger flowers (calyx-tubes  $\pm 1$  cm. long), and the tendency to have leaves rounded at the base rather than cuneate.

***Syzygium Richardsonianum* sp. nov.**

Arbor usque 25 m. alta; ramorum cortice atrofusco cito decorticato; ramulis compressis vel sulcatis; foliis impellucidis novellis tenuiter maturis



rigide coriaceis in sicco supra atrofusciis subtus brunnescentibus minute glandulosis, ellipticis, 7.5–12 cm. longis, 4–8 cm. latis, basim versus sensim angustatis basi cuneatis vel obtusis apice obtusis apiculatis vel subrotundatis margine anguste recurvatis, costa supra leviter canaliculata subtus elevata, nervis primariis utrinsecus circiter 13 utrinque inconspicuis, vena intramarginali a margine 4 mm. distante disposita, venis secundariis submanifestis; petiolo  $\pm$  1.5 cm. longò; inflorescentiis terminalibus  $\pm$  12 cm. longis, 18 cm. latis, divaricatum ramosis, rhachi robusta ramis ramulisque late compressis angulatis, floribus sessilibus, alabastris 8–10 mm. longis, apice 6–7 mm. diametro, calycis tubo turbinato ruguloso (parte supra ovarium 3 mm. producta) basi prismatice subquadrangulato, lobis 4, inaequalibus rotundatis 3–4 mm. longis, cum petalis calyptratis deciduis; staminibus  $\pm$  1 cm. longis; fructibus late subglobosis, 4 cm. longis, 4.5 cm. latis.

NETHERLANDS NEW GUINEA: Bele River, 18 km. northeast of Lake Habbema, *Brass* 11354 (TYPE), November 1938, alt. 2200 m., rain-forest, occasional on banks of river (tree 10–13 m. high; flowers cream-colored; large hard gibbose fruit); 9 km. northeast of Lake Habbema, *Brass & Versteegh* 10498, November 1938, alt. about 2700 m., rare in forest of valleys (tree 25 m. high, 27 cm. diameter; bark thick, white, smooth); *Brass* 10804, October 1938, alt. 2800 m., rare on ridges (tree attaining 25 m.; flowers cream-colored; fruit yellowish white, subglobose,  $\pm$  5 cm. diameter).

By the prismatic lower part of the flower and the broadly compressed branches of the inflorescence, this species may be allied to *Syzygium platypodum* Diels. In our material, however, the calyx-tube is distinctly longer than broad, and none of the leaves in the three collections cited are acuminate; further the dried leaves are nearer yellowish brown than of a copper color. Amongst the Malaysian material the species shows a superficial likeness to *S. palembanicum* Miq. but the leaves are thicker, more obtuse with less obvious venation, and the fruit is not ribbed. Named for Mr. W. B. Richardson, mammologist of the Expedition.

*Syzygium Roemerii* (Lauterb.) comb. nov.

*Jambosa Roemerii* Lauterb. Nov. Guin. **8**: 851. 1912; Diels, Bot. Jahrb. **57**: 387. 1922.

BRITISH NEW GUINEA: Central Division, Mafulu, *Brass* 5487, November 1933, alt. 1250 m., rare in oak forest undergrowth (small tree 6–8 m. tall; leaf-nerves impressed above, prominent beneath; flowers cream-colored).

This collection agrees reasonably well with the original description of this species except that the leaves (although injured on most tips) appear to be short- rather than long-acuminate. The collection differs from the one we have placed in *Syzygium rubellum* (Rech.) Merr. & Perry, in that the leaves are somewhat narrowed above the cordate or amplexicaul base and the lower part of the flower is slenderly stipitate rather than subcylindric.

*Syzygium rubellum* (Rech.) comb. nov.

*Jambosa rubella* Rechinger, Rep. Sp. Nov. **11**: 183. 1912, Denkschr. Math.-Nat. Kl. Akad. Wiss. Wien **89**: 583, f. 25 (Bot. Zool. Ergeb. Wiss. Forsch. Samoa-I. Neug.-Arch. Salomonsins. **5**: 141). 1913.

BISMARCK ARCHIPELAGO: New Britain: Siwai, *Waterhouse* 133 (NYBG), November 1932 (small tree about 6 m. tall; pretty wax-like pinkish fruit—two or three crops in a year).

The specimen is somewhat fragmentary but it appears to be a reasonably good match for Reehinger's description and figure of this species.

*E. Calyx-lobes equal, not more than 2 mm. long.*

*G. Inflorescence lateral.*

*H. Axis and branches of the inflorescence furfuraceous.*

***Syzygium folidorhachis* sp. nov.**

Arbor 18 m. alta; ramis teretibus cortice atrofusco rimoso deinde caduco, ramulis leviter compressis atrofusis novellis minute glandulosis; foliis coriaceis supra manifeste subtus prominule reticulatis minute subcrebre glandulosis, ellipticis, 9–18 cm. longis, 6.5–11 cm. latis, basi breviter cuneatis decurrentibus apice obtusis vel retusis, costa supra canaliculata subtus elevata, nervis primariis numerosis fere subtransversis in venam intramarginalem crenatam 2–3 mm. a margine conjunctis, supra manifestis subtus prominulis; petiolo atrofusco 5–8 mm. longo 3 mm. crasso supra canaliculato; paniculis amplis, 10–25 cm. longis, 4–18 cm. latis, e trunco ortis plerumque divaricato-ramosis; pedunculo  $\pm$  6 cm. longo, pedunculi rhachis ramorum ramulorumque cortice desquamato brunnescente; floribus non visis; fructibus immaturis sessilibus cyathiformibus vel paullo urceolatis, 7 mm. longis, 6–7 mm. latis, calycis tubo fere 2 mm. crasso supra ovarium 2.5 mm. producto, lobis caducis (uno tantum viso 2 mm. longo, 3 mm. lato).

NETHERLANDS NEW GUINEA: 15 km. southwest of Bernhard Camp, Idenburg River, Brass & Versteegh 11917 (TYPE), January 1939, alt. 1730 m., occasional in primary forest (tree 18 m. high, 54 cm. diameter; bark dark brown, scaly; fruits brownish green, borne on the trunk). NORTHEASTERN NEW GUINEA: Ogeramnang, Clemens 4831, December 1936, alt.  $\pm$  2350 m.

This species like *Syzygium furfuraceum* suggests *S. Branderhorstii* Lauterb. and *S. Peekelii* Diels in the leaf-outline and the numerous veins. From the last two it may be distinguished by the scaly character of the rachis and branches of the inflorescence. In the latter feature it resembles *S. furfuraceum* but is easily separated from that by the coriaceous texture of the leaves, the more open and somewhat prominent venation, and the glandular lower surface.

***Syzygium furfuraceum* sp. nov.**

Verisimiliter arbor; ramulis compressis leviter sulcatis atrofusis; foliis chartaceis utrinque crebre reticulatis paululo prominulis in sicco supra olivaceis subtus pallidioribus, ellipticis, 11–15 cm. longis, 7–9 cm. latis, basi subrotundatis dein brevissime cuneatis paullo decurrentibus apice rotundatis vel obtusis vel obtusissime breviterque acuminatis, acumine  $\pm$  5 mm. longo latoque, costa supra impressa subtus elevata, nervis primariis numerosis patentibus vix subtransversis inconspicue manifestis in venam intramarginalem 3–4 mm. a margine conjunctis; petiolo circiter 1.5 cm. longo; inflorescentiis amplis e trunco (?) vel ramis majoribus (?) ortis ramosis, probabiliter  $\pm$  20 cm. longis, ramis patentibus rhachis ramorum ramulorumque cortice cito furfuraceo-desquamato; floribus sessilibus, calycis tubo campanulato 5–6 mm. longo (parte supra ovarium 2.5–3 mm. producta), 6–7 mm. lato, inconspicue striato, lobis 4 circiter 1 mm. longis 3–4 mm. latis; petalis calyptratim caducis; staminibus numerosis, filamentis  $\pm$  1 cm. longis, antheris ovatis 1 mm. longis; fructibus ignotis.



NORTHEASTERN NEW GUINEA: Quembung, *Clemens* 2133 (TYPE), March 1936, alt. about 600 m.; Wareo, *Clemens* 1570, January 1936, alt.  $\pm$  600 m.

Among the species of *Syzygium* already described from New Guinea this probably falls in the vicinity of *S. Branderhorstii* Lauterb. and *S. Peekelii* Diels. The leaf-venation is much less obvious than in either of the latter species. Even before the flower-buds have matured, the bark begins to flake off or curl in minute particles on the axis and branches of the inflorescence causing them to appear furfuraceous. This is the conspicuous character of the species. In *Clemens* 1570 a few of the bracts of the inflorescence still persist, they are oblong, obtuse, 3–4 mm. long.

From Netherlands New Guinea, Bernhard Camp, Idenburg River, we have the following collection which either belongs here or is very closely related: *Brass & Versteegh* 13583, April 1939, alt. 450 m., occasional in primary rain-forest (tree 22 m. high, 50 cm. diameter; bark 14 mm. thick, scaly; flower-buds light green). The leaves are inconspicuously veined, very shiny above; the flower-buds are too young to suggest what might be their later development; the reddish brown axis and branches of the inflorescence are already covered with minute cortical scales.

*Syzygium squamatum* sp. nov.

Arbor 28 m. alta; ramis teretibus cinereo-brunnescentibus; ramulis brunnescentibus inconspicue tetragonis; foliis coriaceis consperse minuteque punctatis vel impellucidis, supra saturato-brunnescentibus subtus pallidioribus crebre inconspicueque reticulatis, oblongo-ellipticis, 5–7 cm. longis, 2.5–3 cm. latis, utrinque angustatis basi cuneatis vel acutis apice acutiusculis vel breviter obtuseque acuminatis margine anguste recurvatis, costa supra canaliculata subtus elevata, nervis primariis patentissimis numerosis in venam intramarginalem vix 1 mm. a margine confluentibus supra inconspicuis subtus manifestis, in foliis novellis prominulis; petiolo 7–8 mm. longo; inflorescentiis multifloris lateralibus a basi ramosis vel subfasciculatis, 16 cm. longis latisque, axis ramorum ramulorumque epidermide furfuraceo-exfoliata cinereo-brunnescente; floribus immaturis vernicoso-nitentibus.

NETHERLANDS NEW GUINEA: 4 km. southwest of Bernhard Camp, Idenburg River, *Brass & Versteegh* 13125 (TYPE), March 1939, alt. 850 m., frequent in primary forest of plain (tree 28 m. high, 53 cm. diameter; bark reddish brown, scaly; flower-buds green).

This is the only specimen we have described with very immature flowers, too small even to guess what they would be at anthesis; however, we believe the lateral inflorescence with grayish brown scaling-off epidermis, the 4-angled branchlets, and the close fairly clear venation of the leaves ought to be sufficient criteria to identify the species.

*H. Axis and branches of the inflorescence not furfuraceous (in S. nemorale glandular-verruculose).*

*I. Leaf-venation open (primary veins of the leaves a little more prominent than the secondary ones).*

*Syzygium Brassii* sp. nov.

Arbor parva; ramis cinereis, ramulis tenuiter compressis fulvis; foliis tenuiter coriaceis impellucidis in sicco brunnescentibus inconspicue laxequae

reticulatis lanceolato-oblongis, 10-23 cm. longis, 3-4.5 cm. latis, basi cuneato-acutis vel breviter acuminatis, apice sensim attenuatis, costa supra impressa subtus prominula, nervis primariis utrinsecus  $\pm$  20 patentibus, in venam intramarginalem 2-3 mm. a margine distantem confluentibus, supra subobscuris subtus manifestis, basim versus cum secundariis fere aequaliter inconspicuis; petiolo 1.5-2 cm. longo atrofusco apicem prope brunnescente; inflorescentiis e nodis defoliatis ortis, usque 15 cm. longis, 10 cm. latis, a basi ramosis multifloris, ramis ad nodos compressis, ramulis leviter compressis; floribus sessilibus, bracteis plerumque caducis, calycis tubo 4-5.5 mm. longo, globoso-urceolato interdum basi brevissime (usque 1 mm.) stipitato, sub lobis leviter constricto minute glanduloso, in sicco ruguloso, lobis 4 subaequalibus circiter 1.5 mm. longis, 2.5 mm. latis; petalis calyptratim caducis; staminibus 5-7 mm. longis, antheris 0.5 mm. longis; fructibus ignotis.

BRITISH NEW GUINEA: Lake Daviumbu, Middle Fly River, *Brass* 7682 (TYPE), September 1939, rain-forest (small canopy tree; branchlets weak; petals and calyx-lobes pink; stamens green).

The best characters of this species are the lateral inflorescence, the slender branchlets with narrow, long-petiolate leaves and the globose-urceolate calyx of the flowers.

***Syzygium cornifolium*** (Blume) comb. nov.

*Jambosa cornifolia* Bl. Mus. Bot. Lugd.-Bat. **1**: 92. 1849; K. Schum. & Lauterb. Fl. Deutsch. Schutzgeb. Südsee 470. 1900; Diels, Bot. Jahrb. **57**: 388. 1922.

*Eugenia cornifolia* (Bl.) K. Schum. & Hollr. Fl. Kaiser Wilhelms Land 89. 1889; Warb. Bot. Jahrb. **13**: 389. 1891; K. Schum. Notizbl. Bot. Gart. Berl. **2**: 137. 1898.

BRITISH NEW GUINEA: Oriomo River, Wuroi, *Brass* 5772, January 1934, common on banks of tidally influenced river (low tree overhanging the water; bright brown flaky bark; yellowish dull leaves; soft pink fruit  $\pm$  1 cm. diameter); Kanosia, *Carr* 11314, February 1935, marshy forest (tree about 15 m. tall; fruit very dark red, almost black).

We have hesitated for some time over this determination. We lack authentic material of both ***Syzygium platycarpum*** (Diels) comb. nov. (*Jambosa platycarpa* Diels, Bot. Jahrb. **57**: 385. 1922) and *S. cornifolium* for comparison. The collections seem to fit better the description of the latter; on the other hand another collection, *Brass* 1148, determined by Diels as representing *J. platycarpa* Diels vel aff. (indicating a doubtful determination) seems to us to be conspecific with those cited above. Like so many other collections we have at hand, the determinations can be made only tentatively until the types are accessible.

***Syzygium flavescens*** (Ridl.) comb. nov.

*Eugenia flavescens* Ridl. Trans. Linn. Soc. Bot. II. **9**: 46. 1916.

BRITISH NEW GUINEA: Lake Daviumbu, Middle Fly River, *Brass* 7659, September 1936, rain-forest along the lake (tree 5-6 m. high with thick bole, spreading low over the water; bark thin, grey-brown, exfoliating in hard flakes; flowers pink; fruit purple-black,  $\pm$  5 mm. long); *Brass* 7954, rain-forest, restricted to shores of the lake (conspicuous and characteristic tree attaining 25 m.; trunk narrowly flanged or fluted at base; bark grey, exfoliating in large thick flaky scales; flower-buds white; young fruit red).

Although the type of this species came from Netherlands New Guinea at about 900 m. alt., the material from Lake Daviumbu appears to represent



Ridley's species as interpreted from his description and the photograph of his type.

*Syzygium kietanum* Rechinger Rep. Sp. Nov. **11**: 183, 1912, Denkschr. Math.-Nat. Kl. Akad. Wiss. Wien **89**: 585 (Bot. Zool. Ergeb. Wiss. Forsch. Samoa-I. Neug.-Arch. Salomonsins. **5**: 143), 1913.

SOLOMON ISLANDS: Bougainville: Kieta, *Waterhouse* 207 (NYBG), February 1933, beach tree yielding tough reddish timber. Ysabel: Jaukau, *Brass* 3150, November 1932, steep foreshores, common (tree 25 m. tall, with bumpy corrugated trunk and main branches; pale brown bark falling in long thick flat scales; leaves shining [dull when dry]; flowers white, very numerous on trunk and main branches).

Although Rechinger compares this species with *Syzygium corynocarpum* (A. Gray) C. Muell., we cannot pass over this material, a perfect match for his description, without pointing out the very close resemblance between these collections and *S. clusiaefolium* (A. Gray) C. Muell. The only difference we can see is that the flowers of the Solomon Islands material are very slightly longer. However, since only very scanty material is at hand, we are maintaining both as species for the present.

It is interesting to note that *Syzygium clusiaefolium* (A. Gray) C. Muell. is included in the "List of plants collected in the islands of Bougainville Straits, Solomon Group, during 1884," taken from Guppy, The Solomon Islands and their Natives 297, 1887.

*Syzygium megistophyllum* sp. nov.

Arbor gracilis 7 m. alta; ramulis teretibus brunnescentibus; foliis coriaceis sessilibus vel subsessilibus, in sicco supra brunnescentibus subtus pallidioribus sublanceolatis, 52-87 cm. longis, 15-34 cm. latis, basi valde cordatis apice (fractis) verisimiliter acuminatis, costa supra subplana subtus elevata, nervis primariis utrinsecus 40-60 patenti-adscendentibus subparallelis in venam intramarginalem  $\pm$  5 mm. a margine distantem conjunctis supra insculptis subtus prominentibus, venis secundariis manifestis oblique clathratis; inflorescentiis e trunco inferiore ortis, rhachi 9 cm. longa, ramis usque 1.5 cm. longis; floribus non visis; fructibus sessilibus, in sicco lageniformibus 4.5 cm. longis (parte inferiore ellipsoidea 3 cm. longa 2 cm. lata, subabrupte in parte superiore umbilicata 1 cm. longa  $\pm$  8 mm. diametro angustata), calycis lobis non visis.

NETHERLANDS NEW GUINEA: 4 km. southwest of Bernhard Camp, Idenburg River, *Brass* 13340 (TYPE), March 1939, alt. 900 m., occasional in *Agathis* forest (slender little branched tree  $\pm$  7 m. high; fruit red, soft and pithy, subglobose, up to 7.5 cm. diameter, clustered on the lower stem less than 1 m. from the ground).

It has been difficult to determine whether this is a new species or whether it belongs to either *Syzygium Schlechteri* Diels or *S. recurvo-venosum* (Lauterb.) Diels. Diels himself pointed out the similarity in the two species but, lacking sufficient material, was unable to decide whether they were really separable or not. Our material differs from *S. Schlechteri* Diels in the terete branchlets and the deeply cordate rather than obtusely emarginate leaves. The fruit is not at all stipitate as is the flower of *S. Schlechteri* Diels. On the other hand, it is not pyriform as that described for *S. recurvo-venosum* (Lauterb.) Diels. It is to be noted also that the dried fruit in shape is unlike the fresh or pickled fruit.

**Syzygium nemorale** sp. nov.

Arbor parva; ramis cinereo-brunnescentibus; ramulis teretibus vel sulcatis brunnescentibus; foliis chartaceis vel tenuiter coriaceis impellucidis inconspicue laxe reticulatis, ovato-ellipticis vel oblongo-ellipticis, 18–21 cm. longis, 9–10 cm. latis, basi rotundatis vel emarginatis apice breviter acuminate, costa supra canaliculata subtus prominente, nervis primariis utrinsecus  $\pm$  9 arcuatim conjunctis infimis interdum liberis prope marginem adscendentibus; petiolo 5–8 mm. longo; paniculis probabiliter lateralibus vel nodis defoliatis ortis, 7–10 cm. longis latisque; ramis ramulisque divaricatis crebre glanduloso-verruculosis; floribus 1–3 apice ramulorum sessilibus basi minute bracteatis, bracteis caducis; calycis tubo turbinato 4–5 mm. longo stipite circiter 2 mm. incluso, margine truncato; petalis calyptratim caducis; staminibus 5–7 mm. longis; fructibus immaturis.

SOLOMON ISLANDS: *Ysabel*: Sigana, *Brass* 3456 (TYPE), January 1933, alt. 100 m., hill rain-forests (small creek bank tree; leaves with dark green nerves; flowers white). *Guadalcanal*: Mamassa, Konga, *Kajewski* 2481, February 1931, alt. 400 m., riverbanks in rain forest (medium sized tree up to 20 m. high; fruit immature).

*Syzygium triphlebium* Diels also has an inflorescence with verruculose branchlets, but the flowers are much smaller than in this species and the inflorescences would seem to be lateral. One is attached to the older growth, the others are all separate.

**Syzygium pyrocarpum** (Greves) comb. nov.

*Eugenia pyrocarpa* Greves, Jour. Bot. **61**: Suppl. 17. 1923.

In the material borrowed from the New York Botanical Garden is the following collection: *Carr* 12767, Koitaki, Papua. The specimen either belongs here or is a strong affinity of the species; it differs from the description in the obvious secondary venation and the wingless petioles. In these two characters it more closely approaches *Syzygium xylanthum* (Greves) comb. nov. (*Eugenia xylantha* Greves, Jour. Bot. **61**: Suppl. 18. 1923) but the primary veins are much more numerous and the inflorescence is short and compact.

*I. Leaf-venation close (primary and secondary veins scarcely distinguishable from each other).*

**Syzygium acetosum** sp. nov.

Arbor magna usque 25 m. alta; ramulis leviter compressis brunnescentibus; foliis chartaceis vel tenuiter coriaceis pellucido-punctatis reticulatis, ellipticis vel late lanceolatis, 12–18 cm. longis, 5.5–9 cm. latis, utrinque aequaliter angustatis basi cuneatis apice anguste obtusis vix acuminatis, costa supra impressa subtus prominula, nervis primariis secundariisque subaequaliter manifestis numerosis patentibus utrinque distinctis, vena intramarginali vix 2 mm. a margine disposita; petiolo 1–1.5 cm. longo 2 mm. lato atrofusco supra canaliculato; inflorescentiis e trunco ortis; floribus non visis, in fructu pedunculo usque 8 cm. ac rhachi usque 10 cm. longis vel brevioribus; cortice interdum rimoso, ramis divaricatis 6–2 cm. longis; fructibus in sicco pyriformibus 3.5 cm. longis, 2.5 cm. latis, immaturis subturbinatis 3 cm. longis, 1.8 cm. latis, apice calycis lobis 4 coronatis umbilicatis, umbilico 3–4 mm. profundo; calycis lobis 1 mm. longis 3–4 mm. latis.

BRITISH NEW GUINEA: Western Division, Daru Island, *Brass* 6267 (TYPE), March



1936, light rain-forest (handsome tree up to 25 m. tall; bark brown, corky, flaky; numerous short panicles borne in scattered clusters up the trunk; fruit of a pleasantly acid flavor, dull red, white inside,  $\pm$  4.5–5 cm. long, 3.5 cm. diameter but variable as to size and shape on different trees; flowers not seen).

The closely veined lanceolate obtusish leaves and the lateral inflorescences are the best characters of this species. The somewhat turbinate younger fruit suggests a rather long clavate or elongate turbinate flower, possibly one something like that described in *Syzygium pyrrhophloeum* Diels from the Bismarck Archipelago. We are unable to suggest any closer alliance of this species.

***Syzygium badium* sp. nov.**

Arbor 27 m. alta; ramis decorticatis; ramulis atrofusis 4-angulatis; foliis coriaceis supra atrofusis subtus brunnescentibus subobscure reticulatis, novellis pellucido-punctatis, vetustioribus  $\pm$  impellucidis, ellipticis, 3.5–6.5 cm. longis, 1.3–3 cm. latis, basi cuneatis vel acutis apice breviter obtuseque acuminatis vel subobtusis margine vix recurvatis, costa supra canaliculata subtus prominula, nervis numerosis patentibus inconspicuis, vena intramarginali circiter 0.5 mm. a margine remota vix manifestis; petiolo 3–4 mm. longo atrofusco supra canaliculato; inflorescentiis laterilibus (?), in specimine typico a basi ramosis  $\pm$  13 cm. longo; floribus non visis; fructibus solitariis apice ramulorum (2–3 mm. longorum) immaturis 9 mm. longis (basim includentibus 3 mm. stipitatis), parte superiore campanulata 7 mm. diametro, maturis late globoso-urceolatis basi brevius stipitatis, circiter 1.5 cm. diametro, apice umbilicatis, umbilico 6–7 mm. lato, 2 mm. longo; calycis lobis non visis.

NETHERLANDS NEW GUINEA: 18 km. southwest of Bernhard Camp, Idenburg River, Brass & Versteegh 11992 (TYPE), February 1939, alt. 2200 m., frequent on slopes in primary forest (tree 27 m. high, 39 cm. diameter; bark 6 mm. thick, brown; young fruit light green, mature red).

In this collection all the infructescences are separate from the foliar specimens which leads us to believe that the inflorescence is lateral; unfortunately none of them show the attachment at the base. In Diels's treatment of *Syzygium* the collection seems to be nearest to *S. petracum* Diels; this, according to his key has 4-angled branchlets and terminal and axillary bracteate inflorescences. The description of the leaves fits our collection fairly well except that here the veins on both surfaces are visible to the naked eye appearing as fine lines with close and inconspicuous reticulations. Most of the fruit is mature.

***Syzygium decipiens* (Koord. & Val.) comb. nov.**

*Eugenia decipiens* Koord. & Val. Meded. Lands Plant. 40: 131 (Bijdr. Boomsoort. Java 6: 131). 1900; Atlas Baumart. Java 3: t. 495. 1915.

SOLOMON ISLANDS: Guadalcanal: basin of Sorvorhio River, Kajewski 2695, January 1932, alt. about 100 m., common in rain-forest (medium sized tree up to 25 m. high with small buttresses; bark brownish grey shedding in flakes; fruit brown-red when ripe, depressed-globular, 9 mm. long, 12 mm. diameter).

Although we have no material of this species from Java for comparison, this is a very good match for a Philippine collection so named. As far as fruit, leaf-outline and venation are concerned, the collection suits that of the plate cited above.

***Syzygium leptophlebioides* sp. nov.**

Arbor; ramulis fulvo-brunnescentibus, novellis leviter compressis; foliis coriaceis, in sicco supra atro-olivaceis subtus leviter pallidioribus, crebre minuteque pellucido-punctatis vel semi-impellucidis, ellipticis, 9–14 cm. longis, 4–5.5 cm. latis, utrinque angustatis basi cuneatis apice breviter obtuseque acuminatis, acumine  $\pm$  1 cm. longo, margine planis, costa supra canaliculata subtus leviter elevata, nervis primariis secundariisque numerosis fere aequaliter manifestis supra inconspicuis subtus distinctis, vena intramarginali 1 mm. a margine remota; petiolo  $\pm$  1.3 cm. longo; inflorescentiis caulifloris interdum terminalibus axillaribusque divaricatis ramosis in specimine typico 24 cm. longis, 18 cm. latis, rhachi 7 mm. ramis 5 mm. diametro, ramulis ultimis late compressis; floribus sessilibus vel interdum brevissime pedicellatis; calycis tubo infero 1.5 mm. crasso-substipitato subangulato, supero 5 mm. subcampanulato in sicco longitudinaliter ruguloso, apice 4–5 mm. diametro, lobis 4 circiter 1–1.5 mm. longis, obtusiusculis; petalis calyptratis caducis; staminibus  $\pm$  7 mm. longis; fructibus ignotis.

NETHERLANDS NEW GUINEA: Hollandia, *Brass* 8979 (TYPE), July 1938, alt. 100 m., one of the very common second layer trees in the rain-forest (bark pale brown shedding in hard thick flakes; inflorescence cauliflorous; calyx pink; stamen cream-colored); hill north of Hollandia, *Neth. Ind. For. Service* bb. 25055, July 4, 1938, alt. 50 m.

We have hesitated for some time before describing this material on account of having at hand the collections *Drs. v. Leeuwen* 9491, 11191, named *Syzygium leptophlebium* Diels; these, in spite of a terminal inflorescence in one, appear to be very closely related to our species, in fact so closely related that we are uncertain whether they are conspecific or not. However, until we can examine Diels's type, it is necessary to accept his description of the species "flores 5-meri" rather than the tentative identification of the numbers above mentioned (in which the flowers have a distinctly 4-lobed calyx). *Drs. v. Leeuwen*'s material differs from that here described in having a calyx-tube with a little shorter base, somewhat less rugulose when dry, and more rounded calyx-lobes, and a terminal inflorescence. The leaves are almost a coppery brown and the minute glands are less obvious. We doubt that these are specific differences. The difference between *S. platypodum* Diels and our species is harder to define, since a cauliflorous tree sometimes has terminal inflorescence; nevertheless, the former is characterized as a shrub with flowers 5–6 mm. long, 6–7 mm. broad, but without any indication as to whether the flowers are 4-merous or 5-merous. In our species the flowers are longer than broad and narrowed at the base into a short thick  $\pm$  angled stipe.

***Syzygium rectangulare* sp. nov.**

Arbor usque 20 m. alta; ramis cinereis, ramulis brunnescentibus compressis, novellis sulcatis; foliis chartaceis crebre pellucido-punctatis, in sicco olivaceis, ellipticis, 7–14 cm. longis, 3–5.5 cm. latis, utrinque angustatis basi obtusis vel cuneatis apice acuminatis, costa supra canaliculata subtus prominula, nervis primariis numerosis tenuibus subparallelis late patentibus utrinque inconspicuis; petiolo 5–7 mm. longo; inflorescentiis e nodis defoliatis ortis  $\pm$  15 cm. longis latisque, pedunculis 2–4 cm. longis, ramis divaricatis compressis subangulatis; floribus apice ramulorum ultimorum sessilibus vel subsessilibus solitariis vel cymosis; calycis tubo turbinato-



obconico basi subangulato, 3 mm. longo (incl. partem 1.5 mm. supra ovarium productam) latoque, margine undulato vel obsolete 4-lobato; petalis calyptatim caducis; staminibus circiter 5 mm. longis; fructibus facie quoad visis subrectangularibus  $\pm$  1 cm. [inter apicem basemque] longis, 1.1–2 cm. latis.

NETHERLANDS NEW GUINEA: Bernhard Camp, Idenburg River, *Brass 13930* (TYPE), 14056, April 1939, alt. 50 m., the characteristic fringe tree of flooded rain-forests of the river plain (tree up to 20 m. high, 50 cm. diameter profusely branched and leaning over the water; bark reddish brown and somewhat flaky; flowers pink with white stamens; fruit a glaucous purple, 4-angled).

Amongst the descriptions of New Guinean species *Syzygium rectangulare* appears to be most like that of *S. megalanthelium* Diels. The leaves cannot well be separated by the descriptions but the inflorescence of our species is much smaller and the flowers are angular rather than cylindric at the base; the latter feature is emphasized in the pulvinate obtusely 4-angled fruits. The species is easily recognized by the lateral profusely small-flowered inflorescences and the somewhat flattened angular fruits.

*Syzygium rosaceum* Diels, Bot. Jahrb. **57**: 406. 1922.

BRITISH NEW GUINEA: Oroville Camp, Fly River, *Brass 7423*, August 1936, rain-forest canopy (large tree; young fruit pink); Lake Daviumbu, Middle Fly River, *Brass 7683*, September 1936, rain-forests (common canopy tree; stem spur-buttressed, covered with thick flaky reddish brown bark; calyx waxy cream-color; petals and stamens pink); Central Division, Ononge Road, Dieni, *Brass 3922*, May 1933, alt. 700 m., rain-forest (tree 30 m., of erect branching habit; bright brown bark shedding in thin papery flakes; upper surface of leaves shining; calyx white; petals red; stamens very pale pink).

These collections answer to the description of *Syzygium rosaceum* Diels from Northeastern New Guinea except that the leaves are a little larger (7–10 cm. long, 2.5–4 cm. broad). It is to be noted that our specimens show terminal, axillary and lateral inflorescences tending, however, to be predominantly lateral.

*G. Inflorescence terminal and axillary.*

*K. Branchlets 4-angled (cf. also S. effusum (A. Gray) C. Muell.)*

*Syzygium Doctersii* sp. nov.

Frutex vel arbor; ramis teretibus cortice  $\pm$  desquamato; ramulis tetragonis atro-brunnescentibus; foliis parvis valde coriaceis impellucidis, supra atro-olivaceis vel brunneo-olivaceis subtus pallide brunnescentibus, obovatis, 2.2–3 cm. longis, 1.2–1.8 cm. latis, basi cuneatis apice rotundatis vel obtusis vel emarginatis, costa supra canaliculata subtus leviter elevata, nervis primariis supra obscuris subtus inconspicuis paene obscuris quapropter lamina subtus primo intuitu nempe leviter striata; petiolo 2 mm. longo atrofusco; inflorescentiis terminalibus vel in axillis foliorum superiorum dispositis, 4–6 cm. longis, a basi ramosis, ramis valde tetragonis pallide brunnescentibus; floribus sessilibus vel breviter pedicellatis; calycis tubo 3–3.5 mm. longo, turbinato basi stipitato, lobis 4 aequalibus obtusiusculis 0.5 mm. longis; petalis calyptatim caducis; staminibus 3 mm. longis; stylo 3–4 mm. longo; fructibus ignotis.

NETHERLANDS NEW GUINEA: Rouffaer Rivier, Zijrivier, *Docters v. Leeuwen 10423* (TYPE).

This collection was distributed under the name of *Syzygium arjakense* (Gibbs) Diels. It differs from the original description of that species in the sharply four-angled branchlets, the cymose branching of the inflorescence, the shorter petioles, and the shorter stamens.

***Syzygium leptoneurum*** Diels, Bot. Jahrb. **57**: 407. 1922.

BRITISH NEW GUINEA: Central Division, Kubuna, *Brass 5583*, November 1933, alt. 100 m., gravelly river bottom (small horizontally branched tree 4–5 m. high; flowers white; fruit immature; trees mostly in young bud); Kanosia, *Carr 11356*, February 1935, banks and islands in rivers (shrub  $\pm$  2.5 m. high; flowers white).

As far as can be determined from the description, our plants are identical with this species. The dried short-stipitate fruits of *Brass 5583* are subglobose and about 8 mm. in diameter.

***Syzygium leptopodium*** sp. nov.

Frutex vel arbor parva; ramis teretibus cinereo-brunnescentibus; ramulis tetragonis brunnescentibus; foliis chartaceis vel tenuiter coriaceis in sicco supra olivaceis subtus pallidioribus inconspicue reticulatis, lanceolatis vel ovatis, 3.5–6.5 cm. longis, 1.3–2.8 cm. latis, basi rotundato-cuneatis vel breviter cuneatis interdum fere rotundatis, apice obtuse (interdum acutiuscule) breviter acuminatis, margine paulo recurvatis, costa supra impressa subtus prominula, nervis primariis utrinsecus 13–19 subtransversis in venam intramarginalem circiter 1 mm. a margine confluentibus supra inconspicuis subtus manifestis; petiolo 1–2 mm. longo; inflorescentiis axillaribus terminalibusque paucifloris, rhachi plerumque 1–1.5 cm. longa tetragona; floribus sessilibus; alabastris  $\pm$  13 mm. longis, anguste clavato-turbinatis, parte inferiore (clavata) circiter 1 cm. longa, parte superiore ampliata  $\pm$  3 mm. diametro; petalis cito calyptratim caducis; staminibus numerosis usque 5 mm. longis; fructibus in sicco pyriformibus  $\pm$  1 cm. longis.

NORTHEASTERN NEW GUINEA: Ogeramang, *Clemens 4526, 5056, 5119a, 5326* (TYPE), December–February 1937, alt. 1750–1800 m., in forest hills (small tree or shrub with white flowers and very dark fruit); Yunzaing, *Clemens 3951*, August 1936, alt. 1650 m., mountain forest (shrub with white flowers and dark fruit).

This species is related to *Syzygium leptanthum* (Wight) Niedenzu but has smaller leaves with a different outline. The flower coincides fairly well with the description of that of *S. heloanthum* Diels but the inflorescence is characteristically short; further, we are inclined to believe that leaves characterized as having numerous nerves would have a closer venation than appears in our species.

***Syzygium maschalocladum*** sp. nov.

Arbor usque 20 m. alta; ramis  $\pm$  decorticatis; ramulis novellis manifeste quadri-alatis brunnescentibus; foliis pellucido-punctatis, in sicco supra atro-brunneis subtus pallide olivaceis crebre reticulatis minute glandulosi, oblongis vel oblanceolatis, 7–12 cm. longis, 3–4.5 cm. latis, basi anguste cuneatis vel acutis, apice subabrupte breviter acuminatis, acumine 5–10 mm. longo obtusiusculo, margine anguste recurvatis, costa supra canaliculata subtus elevata crebre glandulosa, nervis primariis numerosis inter se circiter 2 mm. distantibus patenti-adscententibus, interdum furcatis, in venam intramarginalem vix 2 mm. a margine confluentibus, supra manifestis subtus prominulis; petiolo  $\pm$  5 mm. longo supra canaliculato; in-



florescentiis 2-3-fasciculatis usque 8 cm. longis, 13 cm. latis, in ramis hornotinis vel annotinis terminalibus, a basi ramosis, ramis subdivaricatis, rhachi anguste 4-alata, ramulis compressis tetragonis; floribus non visis; fructibus sessilibus apice ramulorum cymosis, 4-5 mm. longis, immaturis, globoso-pyriformibus, calycis lobis 5 brevibus coronatis, crebre minuteque glandulosi.

NETHERLANDS NEW GUINEA: 15 km. southwest of Bernhard Camp, Idenburg River, *Brass & Versteegh 11909* (TYPE), *Brass 12144*, January 1939, alt. 1740 m. and 1800 m., occasional subsidiary tree in rain-forest of slopes (tree 15-20 m. high; bark brown, scaly; fruit red-brown, [in the second collection cited] purple).

This species approaches both *Syzygium scytophyllum* Diels and *S. tacinatum* Diels judging by their descriptions. It differs from the second in having panicles divaricately branching from the base (not long pedunculate nor with strict branches), and 5 calyx-lobes; it may be distinguished from the first by its more obvious leaf-venation. What the character of the branchlets is in *S. scytophyllum* Diels we could not discover either in the key to the genus or in the original description. In our species the winged branchlets are very obvious.

*K. Branchlets terete or sulcate, not angled.*

*L. Leaves subsessile, cordate or emarginate at base.*

***Syzygium camptodromum* sp. nov.**

Frutex magnus vel arbor parva; ramulis teretibus cortice atrofusco rimoso atque in squamis parvis secedente; foliis tenuiter coriaceis, in sicco brunnescentibus inconspicue reticulatis oblongo-lanceolatis,  $\pm$  37 cm. longis 13 cm. latis, basi cordatis, apice (summo fracto) acutis vel acuminatis(?), costa supra paullo elevata leviter canaliculata subtus prominula, nervis primariis utrinsecus 18-20 subirregulariter dispositis oblique patentibus in venam intramarginalem arcuatam prominulam  $\pm$  1.5 cm. a margine distantem confluentibus, vena intramarginali secundaria (interdum extus tertia) cum primaria subparallela manifesta circiter 4 mm. a margine disposita; petiolo vix 5 mm. longo atrofusco basi folii tecto; panícula terminali,  $\pm$  11 cm. longa, axi brunnescente, ramis (inferiore) 7-(superiore) 2 cm. longis, patentibus; floribus non visis, verisimiliter clavatis; fructibus  $\pm$  2.5 cm. longis, 1 cm. diametro, parte inferiore pyriformi circiter 2 cm. longa, calycis tubo  $\pm$  7 mm. longo 5 mm. diametro coronata.

SOLOMON ISLANDS: *Ysa bel*: Sigana, *Brass 3528* (TYPE), January 1933, coastal rain-forests (large stiffly branched shrub or small tree).

A very distinct species with large cordate openly veined leaves and relatively short inflorescence.

***Syzygium subamplexicaule* sp. nov.**

Arbuscula 2.5 m. alta; ramulis brunnescentibus vix compressis; foliis chartaceis crebre minuteque pellucido-punctatis, in sicco olivaceis vel viridescentibus laxe reticulatis lanceolato-oblongis, 22-27 cm. longis, 5-9 cm. latis, basi cordatis vel emarginatis apice acuminatis, acumine 2-2.5 cm. longo, costa supra leviter canaliculata subtus elevata, nervis primariis subirregularibus utrinsecus circiter 22 late patentibus supra manifestis subtus prominulis, secundariis cum primariis subparallelis fere aequaliter prominulis; petiolo crasso circiter 3 mm. longo; inflorescentiis terminalibus brevissimis a basi breviter ramosis, rhachi  $\pm$  1 cm. longa valde com-

pressa; floribus apice ramorum cymosis vel solitariis sessilibus gracillime clavatis creberrime glandulosis; calycis tubo circiter 16 mm. longo, basi 0.5 mm. apice 2–2.5 mm. diametro, lobis 4 circiter 1 mm. longis; staminibus 4–6 mm. longis, antheris minutis; fructibus oblongo-ovoideis basi stipitatis, 1.7 cm. longis (incl. 4 mm. stipitem), 0.6 cm. diametro, striato-rugulosi dense glandulosis; semine oblongo, cotyledonibus glandulosis.

BRITISH NEW GUINEA: Lower Fly River, east bank opposite Sturt Island, *Brass* 8218 (TYPE), October 1936, rain-forest (undergrowth near-tree 2.5 m. high; fruit pink—a few dried flowers amongst fruit).

This species suggests *Syzygium novo-guineense* nom. nov. (*Jambosa auriculata* Blume Mus. Bot. Lugd.-Bat. 1: 104. 1849, which was based on the herbarium name *Myrtus auriculata* Zipp.), but it differs in many points from the description of that species. The leaves are copiously pellucid-punctate, the flower is so very slender that it could not be called turbinate, the lobes of the calyx are very small and of about equal size, from the fullness of the seed the fruit appears to be about mature and it is very much smaller than that of Blume's species; hence, we have decided that the resemblance is mostly in the leaf-outline. The fruit is similar in appearance and structure to a small fruit of *Syzygium claviflorum* (Roxb.) A. M. & J. M. Cowan. The specific name *auriculatum* has already been used for a New Caledonian species.

*L. Leaves petiolate.*

*M. Leaves with open venation (primary veins more obvious than the secondary except possibly in S. cartilagineum).*

***Syzygium bicolor* sp. nov.**

Arbor magna; ramulis compressis vel subangulatis brunnescentibus; foliis coriaceis impellucidis opacis, supra olivaceis subtus subcinnamomeis inconspicue reticulatis, ellipticis, 3–4.5 cm. longis, 1–1.7 cm. latis, utrinque aequaliter angustatis basi cuneatis apice acutiusculis, costa supra impressa subtus prominula, nervis primariis utrinque 4–6 subadscendentibus in venam intramarginalem 2–3 mm. a margine confluentibus supra leviter insculptis subtus subprominulis; petiolo  $\pm$  4 mm. longo nigrescente supra canaliculato; inflorescentiis terminalibus atque in axillis foliorum superiorum dispositis, rhachi plerumque usque 1.5 cm. longa ramisque argute tetragonis vel anguste alatis; alabastris clavatis, basi 2 mm. stipitatis,  $\pm$  11 mm. longis; calycis tubo minute ruguloso vel vermiculari-ruguloso, 9 mm. longo, basi 1 mm. crasso, sub lobis 4 mm. diametro, lobis 5 vix 1 mm. longis subtruncatis; petalis singillatim vel calyptratim deciduis; staminibus 5–7 mm. longis; fructibus ignotis.

NETHERLANDS NEW GUINEA: 6 km. southwest of Bernhard Camp, Idenburg River, *Brass* 13018 (TYPE), March 1939, alt. 1200 m., rain-forest (frequent large tree rising above forest canopy layer; bark flaky, reddish brown; flowers white).

The flowers of this species show some resemblance to those of *Syzygium zeylanicum* (L.) DC. but they are more evenly clavate with a less marked stipe. Among Papuan species the collection seems nearer the description of *Syzygium combretiflorum* (Diels) comb. nov. (*Jambosa combretiflora* Diels, Bot. Jahrb. 57: 392. 1922) than any other, but in the latter the leaves are long-acuminate and the calyx-tube about 4 mm. long.



*Syzygium bicolor* is readily recognized by the small leaves and the very finely rugulose calyx.

*Syzygium cartilagineum* sp. nov.

Arbor parva; ramulis levibus pallide brunnescentibus; foliis coriaceis, in sicco supra olivaceis subtus paullo pallidioribus crebre minuteque pellucido-punctatis utrinque reticulatis, obovatis, 21–22 cm. longis, 10.5–13 cm. latis, apice rotundatis basi cuneatis leviter obliquis, margine induratis crassiusculis cartilagineis, costa supra plana vel basim versus paullo elevata subtus carinata, nervis primariis numerosis late patentibus inter se 4–5 mm. distantibus marginem attingentibus utrinque distinctis, vena intramarginali nulla; petiolo 3.5–4 cm. longo leviter carinato; inflorescentiis pluri-ramosis multifloris subcorymbosis pseudoterminalibus, 14 cm. longis, 20 cm. latis, ramis ramulis late compressis 4-angulatis; alabastris apice ramulorum ultimorum pedicellatis vel interdum sessilibus, obovoideo-oblongis, 8 mm. longis, 5 mm. latis; calycis lobis 4 brevibus, floribus in anthesi non visis.

SOLOMON ISLANDS: S a n C r i s t o b a l : Hinuahaoro, *Brass 3062* (TYPE), September 1932, alt. 900 m., mountain rain-forests (small tree; leaves stiff and shining).

This species is well marked by foliar characters: the midrib on the lower surface and the petiole are keeled; the primary veins, instead of either fading out near the margin of the blade or anastomosing to form or join a submarginal vein, extend from the midrib to the rather thick indurated cartilaginous margin of the leaves. In other words, the intramarginal vein has merged with the margin of the leaf resulting in the thick margin here represented. This is an unusual character in the genus; unfortunately mature fruit and full grown flowers are lacking, but in the structure of the immature flower-buds we have no characters which would exclude the collection from *Syzygium*.

*Syzygium capituliferum* sp. nov.

Arbor 5–6 m. alta; ramis atro-cinereis; ramulis compressis brunnescentibus; foliis coriaceis impellucidis supra levibus brunnescentibus subtus pallidioribus manifeste laxe reticulatis, ellipticis vel oblongis, (3–)4.5–8 cm. longis, 1.7–4.5 cm. latis, basi obtusis vel obtuse cuneatis, apice obtusis vel rotundatis, margine interdum paullo recurvis saepe planis, costa supra vix impressa subtus prominula, venis primariis supra inconspicuis subtus prominulis, infimis longe adscendentibus, caeteris patenti-adscendentibus arcubus 5–6 intramarginalibus a margine 5 mm. remotis conjunctis; petiolo 6–7 mm. longo nigrescente; inflorescentiis terminalibus axillaribusque multifloris, rhachi brevissima, floribus glomeratis; calycis tubo circiter 4 mm. longo, in sicco ruguloso, lobis 5 minimis; petalis circiter 2 mm. diametro calyptratim deciduis; staminibus  $\pm$  5 mm. longis; fructibus ignotis.

BRITISH NEW GUINEA: Western Division, Wassi Kussa River, Tumbuke, *Brass 8482* (TYPE), December 1936, common in rain-forest along streams (tree 5–6 m. high; leaves thick-coriaceous, margins narrowly recurved, veins prominent beneath; flowers white).

A very distinct species easily recognized at a glance by the unusual leaf-venation and the very short inflorescences. The flowers are crowded into small compact clusters scarcely longer than the petiole subtending them; the lower primary veins (2 or 3 or sometimes 4) tend to appear elongated as intramarginal veins (connected by the reticulum of the secondary vena-

tion) ascending toward the apex of the leaf rather than emerging from the midrib and becoming confluent with the submarginal vein as is the case in a large number of species of *Syzygium*.

*Syzygium japonense* sp. nov.

?Arbor; ramulis teretibus epidermide tenuissima squamoso-exfoliata, novellis compressis leviter sulcatis; foliis tenuiter coriaceis impellucidis obscure reticulatis, ovatis vel lanceolatis, (3-)6-8 cm. longis, (1-)2-4.5 cm. latis, basi breviter cuneatis apice sursum  $\pm$  angustatis obscure acuminatis obtusiusculis vel acutis, costa supra plana subtus prominente, nervis primariis patenti-adscentibus utrinsecus  $\pm$  10 supra leviter impressis subtus manifestis non prominulis in venam intramarginalem 1.5-2 mm. a margine confluentibus; petiolo  $\pm$  5 mm. longo; inflorescentiis terminalibus vel axillaribus a basi ramosis vel pedunculatis, 8 cm. longis, circiter 13 cm. latis, ramulis subteretibus; floribus sessilibus, alabastris 7 mm. longis, apice 2-2.5 mm. diametro, parte inferiore cylindrica basi leviter angustata superiore obovoidea; calycis tubo 4-5 mm. longo, margine 4-dentato; petalis calyptratim caducis; staminibus  $\pm$  5 mm. longis; fructibus ignotis.

NETHERLANDS NEW GUINEA: Japen Island, Seroei, *Neth. Ind. For. Service* bb. 30584 (TYPE), September 1939, alt. 5 m.

Among New Guinean species this is closest to *Syzygium modestum* Diels, but the leaves are smaller and not markedly acuminate, and the venation is inconspicuous.

*Syzygium Lorentzianum* Lauterb. Nov. Guin. **8**: 852. 1912; Diels, Bot. Jahrb. **57**: 402. 1922.

NETHERLANDS NEW GUINEA: Hollandia, *Brass* 8864, June 1938, alt. 20 m., common in open second growths on a rocky slope (bushy tree 5 m. high, with long weak branches; flowers cream-colored with pink calyx; ripe fruit green).

It can scarcely be doubted that this number collected at the type-locality represents Lauterbach's *Syzygium Lorentzianum*. The flowers are about 7 mm. long instead of 5 mm., and the leaves are ovate-elliptic rather than lanceolate although the measurements approximate those of the original diagnosis; apart from these minor differences, the specimens suit the description perfectly. The fruit is ellipsoid to obovoid-ellipsoid, at times slightly ventricose, up to 3 cm. long, 2.6 cm. diameter, crowned by the truncate 4 mm. calyx-tube. Previously known only from flowering material. One branch of the collection shows a lateral inflorescence.

*Syzygium modestum* Diels, Bot. Jahrb. **57**: 400. 1922, vel aff.

SOLOMON ISLANDS: Bougainville: Kupei Gold Field, *Kajewski* 1661, 1756, March 1930, alt. 950 m. and 1000 m., rain-forest (small tree 10-15 m. high; petals green, stamens white; fruit hard, oblong, purple when ripe, 3.5-3.8 cm. long, 2-2.5 cm. diameter).

These collections differ from Diels's description in having longer petioles ( $\pm$  1 cm. long), larger leaves ( $\pm$  18 cm. long, 7.5 cm. diameter), and the ultimate branchlets of the inflorescence tetragonous. There is a close resemblance between the collections and the descriptions of both *Syzygium trivene* (Ridl.) comb. nov. (*Eugenia trivenis* Ridl. Trans. Linn. Soc. Bot. II. **9**: 47. 1916), and *S. modestum* Diels. Whether they are conspecific can only be determined by an actual examination of the types involved.



*Syzygium rubiginosum* sp. nov.

Arbor magna; ramis cortice rimosis brunnescentibus; ramulis teretibus ad apicem paullo compressis rubro-brunnescentibus; foliis crasse coriaceis subnitidis, in sicco pallide brunnescentibus vel interdum rubro-brunnescentibus glabris inconspicue reticulatis, late vel anguste ellipticis, 7–13 cm. longis, 3.5–10.5 cm. latis, basi cuneatis vel rotundatis vel rotundato-cuneatis, apice obtusis vel retusis, costa perspicua, nervis primariis utrinsecus 9–13 utrinque distincte manifestis in venam intramarginalem aequaliter manifestam 2–4 mm. a margine confluentibus; petiolo  $\pm$  1 cm. longo atro-fusco minute rugoso; inflorescentiis terminalibus amplis, 9–13 cm. longis, 10–20 cm. latis, a basi ramosis, ramulis substrictis rubescenti-brunnescentibus, cortice levi, bracteis ovatis obtusis, vix 1.5 mm. longis, cito caducis; floribus sessilibus, alabastris 1 cm. longis; calycis tubo pyriformi (parte supra ovarium 3 mm. producta) 7–8 mm. longo, lobis 4 obtusis, 1 mm. longis, 2–3 mm. latis, maturitatem versus deciduis; petalis  $\pm$  5 mm. diametro calyptratim caducis; staminibus  $\pm$  1 cm. longis, antheris oblongis  $\pm$  6 mm. longis; fructibus minute verruculosis subglobosis vel transverse ellipsoideis, usque 3 cm. diametro, 2.5 cm. longis.

BRITISH NEW GUINEA: Lake Daviumbu, Middle Fly River, *Brass* 7491 (TYPE), 7510, August 1936, plentiful and, with a few other large outstanding trees, forming a super-canopy layer in the rain-forests (trunk cylindrical or slightly fissured at base; bark very thick, hard, exfoliating in rather flaky suberose scales; leaves stiff, smooth, shining, with slightly recurved margins; flowers white); Tarara, Wassi Kussa River, *Brass* 8390, December 1936, common in rain-forest fringing river (tree 15–20 m. high, with thick fibrous crumbly brown bark; leaf-venation obscure beneath; young fruit white).

In the terminal inflorescence with fairly large flowers as well as the elliptic leaves, this species suggests *Syzygium grande* (Wight) Walp., but the reticulate venation is much less marked and the flowers do not taper to a stipe-like base; also the fruit is subglobose to transversely ellipsoid rather than oblong-ovoid.

*Syzygium Schumannianum* (Niedenzu) Diels, Bot. Jahrb. 57: 402. 1922, vel aff. *Eugenia neurocalyx* K. Schum. & Holtr. Fl. Kaiser Wilhelms Land 90. 1889, non A. Gray.

*Jambosa Schumanniana* Niedenzu in Engler & Prantl, Nat. Pflanzenfam. 3(7): 84. 1893.

*Eugenia Schumanniana* Greves, Jour. Bot. 61: Suppl. 18. 1923.

NETHERLANDS NEW GUINEA: 4 km. southwest of Bernhard Camp, Idenburg River, *Brass* 13610, March 1939, alt. 850 m., common in rain-forest of more or less swampy river-plain (subsidiary tree  $\pm$  20 m. high; fruit white, prominently ribbed).

We have only a fruiting specimen to compare with the original description which is based probably on a flowering specimen with immature fruit. The leaves of *Brass* 13610 are 9–17 cm. long, 3.5–7 cm. broad, oblanceolate-oblong (rather than oblong) with a recurving apical tip; the 13–17 obvious primary veins join the inner equally manifest intramarginal vein 5–6 mm. within the margin, the outer one is much fainter and closer to the margin. Outside and within on the calyx-tube projecting beyond the ovary the fruit is copiously glandular; the youngest one shown in the collection is 3 cm. long and near the base 1 cm., narrowing towards the apex to about 7 mm. diameter; the older fruits are distinctly lageniform, about 4 cm. long and

1.5–2 cm. diameter in the middle of the enlarged lower part, the upper part of the calyx-tube between the base of the style and the recurved lobe is 1.5 cm. long. Usually there is a definite marked line or region at the base of the lobes indicating the staminal disk. In this collection the lobes are somewhat irregular in size and on these is a lighter colored zone which might indicate where the stamens were attached, in which case it would seem as if the true calyx-lobes had been shed or persisted as remnants beyond this zone and the apparent recurved lobes really represent the upper part of the stiff calyx-tube which has split at the apex along some of the prominent ridges. On one inflorescence axis were remnants of stamens which we assume belonged to the flower of this species. The anthers are very small (0.5 mm. diameter).

***Syzygium subglobosum* sp. nov.**

Arbor  $\pm$  26 m. alta; ramorum cortice desquamato; ramulis compressis atrofusis; foliis coriaceis, in sicco supra viridi-brunnescentibus vel atrofusis inconspicue reticulatis, subtus pallidioribus fere glaucis, ellipticis, 13–14 cm. longis, 7–8 cm. latis, utrinque subaequaliter rotundato-angustatis, basi rotundato-cuneatis vel obtusis, apice recurvatis breviter obtuse-que acuminatis (saepissime fractis), margine revolutis, costa supra canaliculata subtus elevata, nervis primariis utrinsecus  $\pm$  15 subtransversis supra manifestis subtus subobscuris in venam intramarginali circiter 7 mm. a margine confluentibus, vena intramarginali secundaria inconspicua  $\pm$  3 mm. a margine disposita; petiolo  $\pm$  1.5 cm. longo atrofusco; inflorescentiis terminalibus, in fructu 8–10 cm. longis, subcorymbosis; floribus non visis; fructibus subglobosis  $\pm$  2 cm. diametro cicatricula calycis loborum coronatis, lobis duobus oppositis visis (1 mm. longis 2 mm. latis) rotundatis deciduis, in fructu calycis tubo brevissimo fere nullo.

NETHERLANDS NEW GUINEA: 6 km. southwest of Bernhard Camp, Idenburg River, *Brass & Versteegh 12584* (TYPE), February 1939, alt. 1150 m., occasional on ridges in primary forest (tree 26 m. high, 63 cm. diameter; bark red, scaly; fruit green-brown); 15 km. southwest of Bernhard Camp, Idenburg River, *Brass & Versteegh 11945*, January 1939, alt. 1830 m., rare in rain-forest (tree 28 m. high, 64 cm. diameter; bark reddish brown, scaly, smooth).

The best features of this species are the very dark branchlets, the rather stiff leaves with the widely spreading primary veins more readily seen above than below, and the terminal inflorescence. The fruits look very much like those of a specimen of *Eugenia kuranda* F. M. Bail. from Queensland, but the depression at the apex of the fruit is much shallower, in fact almost none. Two calyx lobes still adhere to a small fruit; these are opposite so it seems safe to conclude that the flower is 4-merous.

***Syzygium Waterhousei* sp. nov.**

Arbor gracilis 6–8 m. alta; ramulis subteretibus pallide brunnescentibus; foliis chartaceis vel tenuiter coriaceis minute pellucido-punctatis vel maturis impellucidis inconspicue subtrabeculatis reticulatis, lanceolatis vel lanceolato-ellipticis interdum ellipticis, 15–25 cm. longis, 5–12 cm. latis, basi cuneatis vel obtusis apice acutis vel breviter acuminatis, costa supra leviter canaliculata subtus elevata, nervis primariis patentibus utrinsecus 10–13



supra impressis subtus perspicuis in venam intramarginalem 5–6 mm. a margine confluentibus; petiolo circiter 1 cm. longo; inflorescentiis terminalibus vel lateralibus a basi compacte ramosis vel breviter pedunculatis,  $\pm$  6 cm. longis, 5–10 cm. latis, ramis ramulisque leviter compressis non angulatis; floribus apice ramulorum sessilibus plerumque cymosis; alabastris  $\pm$  9 mm. longis; calycis tubo circiter 9 mm. longo, sub apice 6–7 mm. diametro, turbinato vel obconico basi vix 2 mm. stipitato, margine fere truncato indistincte lobato; petalis calyptratis 3–4 mm. diametro; staminibus vix 1 cm. longis; fructibus circiter 3.5 cm. longis, 1.5–2 cm. diametro, subfusiformibus vel subpyriformibus, semine oblongo, 1.7 cm. longo, 1 cm. diametro.

BISMARCK ARCHIPELAGO: New Britain, Siwai, *Waterhouse 120*. SOLOMON ISLANDS: Ysabel: Tiratona, *Brass 3208* (TYPE), November 1932, alt. 600 m. mountain forests, very common (slender tree with drooping branches, 6–8 m. tall; brown scaly bark; inflorescence pale brown; fruit brown, dry; seed purple). Bougainville: Kieta, *Kajewski 1602*, March 1930, alt. 100 m., common in rain-forest on creek bank (small tree up to 10 m. high; flower buds light creamy green with a touch of pink); Marromaromino, *Kajewski 2207*, September 1930, alt. 50 m., common in rain-forest (medium sized tree up to 15 m. high).

The best characters of this species are the fairly prominent primary and intramarginal veins of the leaves, the fairly large almost truncate flower-buds, the nearly terete axis and branches of the inflorescence, and the subfusiform or subpyriform fruits.

*M. Leaves with close venation (primary and secondary about equally prominent).*

*N. Leaves rounded, obtuse, or shortly obtuse-acuminate (cf. also S. leptanthum and S. subcorymbosum).*

*Syzygium acmenoides* sp. nov.

Arbor usque 30 m. alta; ramulis pallide brunnescentibus subteretibus, epidermide tenuissima sub lente exfoliata, cortice crebre rimoso; foliis tenuiter coriaceis pellucido-punctatis supra olivaceis subtus pallide brunnescentibus manifeste crebre reticulatis, oblongo-ellipticis vel lanceolato-ellipticis, 5.5–9 cm. longis, 2.5–3.8 cm. latis, utrinque angustatis basi cuneatis vel acutis apice obtusis vel late obtuseque acuminatis margine vix revolutis, costa supra plana vel leviter canaliculata subtus prominula, nervis numerosis valde adscendentibus supra nempe striatis subtus perspicuis in venam intramarginalem aequaliter perspicuam 1 mm. a margine confluentibus; petiolo 5–7 mm. longo; inflorescentiis terminalibus a basi ramosis 5–9 cm. longis latisque; ramis ramulisque subangulatis; floribus non visis; fructibus sessilibus basi tenuiter stipitatis (stipite 3–4 mm. longo), supra depresso globosis, in sicco  $\pm$  1 cm. diametro calycis lobis 4 brevissimis coronatis.

BRITISH NEW GUINEA: Western Division, Wassi Kussa River, Tarara, *Brass 8644* (TYPE), January 1937, one of the chief dominants in rain-forests (handsome tree attaining 30 m.; bark pale brown, hard, shedding in very small scales; leaves slightly concave; fruit white, rugose, 2–2.5 cm. diameter); Penzara, between Morehead and Wassi Kussa Rivers, *Brass 8465*, December 1936, common in creek fringing rain-forest (tree 12–14 m. high; fruit white, rugose).

Seemingly, this is a very distinct species readily recognized by the fairly thin somewhat obtuse leaves with strongly ascending close reticulate vena-

tion, somewhat similar to that found in *Syzygium Muelleri* Miq. of Borneo and the Malay Peninsula. The fruit is much wrinkled, having shrunk almost half its size in drying.

*Syzygium adelphicum* Diels, Nov. Guin. 14: 93. 1924.

NETHERLANDS NEW GUINEA: 18 km. southwest of Bernhard Camp, Idenburg River, *Brass & Versteegh 11995*, February 1939, alt. 2180 m., common on ridges in primary forest (tree 23 m. high, 37 cm. diameter; flowers white).

This collection is a fairly good match for the description of *Syzygium adelphicum* Diels. It is to be noted, however, that although the terminal inflorescences are sessile or subsessile, those in the upper leaf-axils have a peduncle 4–5 mm. long. The upper part of the internodes of the new branchlets is narrowly winged; toward the base of the internodes the wings expand and seemingly touch or overlap to form a sort of a pocket or sac. As the branchlet grows older the bark cracks off and this character is lost.

*Syzygium adelphicum* var. *adenanthum* var. nov.

A forma typica differt foliis minoribus 0.5–1.2 cm. longis, 0.4–0.9 cm. latis, crebre pellucido-punctatis, nervis primariis utrinque prominulis, petiolo 1.5–2 mm. longo, inflorescentiae bracteis alabastra in longitudine subaequantibus.

BRITISH NEW GUINEA: Central Division, Mt. Tafa, *Brass 4040* (TYPE of var.), May 1933, alt. 2300 m., the commonest mossy forest tree (shapely tree 40–50 ft. tall with open crown densely foliated at the branch tips; bark brown and flaky; pale hard wood; leaves very glossy, dark veined beneath; petals and stamens white tinged with pink; small green fruit); *Brass 4854*, August 1933, alt. 2700 m., forest fringe just below cleared summit of mountain (densely foliated flat-topped tree 4–5 m. high; shining small leaves with reddish brown margins giving the whole tree a brown appearance).

These collections from Mt. Tafa so closely approach the smaller branches of *Brass & Versteegh 11995* which we have interpreted as *Syzygium adelphicum* Diels that we have been unable to decide whether a series of collections would show sufficient intermediates to prove them to be a single species or two closely related ones. Meanwhile, we note that the leaves of *S. adelphicum* Diels are opaque, except when very young, although copiously dotted on the lower surface with dark glands, and the primary veins appear merely as lines on the upper surface; on the other hand, in *Brass 4040*, *4854*, the leaves are copiously pellucid-punctate and the primary veins are almost equally elevated on both surfaces. As a whole the leaves are smaller with shorter petioles and much more crowded than in the collection from the Bernhard Camp region.

*Syzygium effusum* (A. Gray) C. Muell. in Walpers Ann. 4: 838. 1857; Diels, Bot. Jahrb. 57: 409. 1922.

*Eugenia effusa* A. Gray, Bot. U. S. Expl. Exped. 524. 1854.

NORTHEASTERN NEW GUINEA: Wareo, *Clemens 1795*, February 1936, alt. about 600–900 m.; Quembung, *Clemens 2136*, March 1936, alt. about 600 m. SOLOMON ISLANDS: Bougainville: Lake Luralu, *Kajewski 2065*, August 1930, alt. 1500 m., rain-forest (medium sized tree up to 15 m. tall; fruit whitish green, 4 mm. long, 5 mm. diameter — one of the largest trees in this area of stunted trees).

The collections above cited are a fairly good match for the type of this species collected first in Fiji. The Solomon Islands collection is in young



fruit; some of the leaves tend to be slightly narrowed into an obtuse rather than a rounded apex which, on drying, rolled back; the inflorescence is somewhat shorter, with more robust branchlets and perhaps the tendency to 4-angled branchlets is a little more marked than in the original, but temporarily we are placing the collection with this species.

***Syzygium ganophyllum*** Diels, Bot. Jahrb. **57**: 408. 1922.

NETHERLANDS NEW GUINEA: 18 km. southwest of Bernhard Camp, Idenburg River, Brass & Versteegh 11988, February 1939, alt. 2000 m., frequent on ridges in primary forest (tree 20 m. high, 46 cm. diameter; fruit light green); 15 km. southwest of Bernhard Camp, Idenburg River, Brass & Versteegh 11913a, January 1939, alt. 1740 m., frequent on rain-forest slopes.

***Syzygium micropetalum*** sp. nov.

Arbor  $\pm$  20 m. alta; ramis atro-cinereis cortice rimosis; ramulis 4-angulatis rubro-brunnescentibus; foliis tenuiter coriaceis, novellis crebre pellucido-punctatis, supra olivaceis minute punctatis subtus pallidioribus minute atro-glandulosis, oblongis vel obovato-ellipticis, 2.5–5 cm. longis, 0.8–2.5 cm. latis, basi anguste cuneatis apice obtusis, costa supra canaliculata subtus elevata, nervis primariis utrinsecus  $\pm$  17 interdum furcatis oblique patentibus, supra inconspicue manifestis subtus prominulis, secundariis  $\pm$  prominulis, vena submarginali a margine 1 mm. remota; petiolo circiter 4 mm. longo; inflorescentiis terminalibus axillaribusque folia in longitudine subaequantibus, pauciramosis, rhachi ramisque tetragonis; floribus sessilibus 3–7 in apice ramorum dispositis; calycis tubo obconico-campanulato circiter 3 mm. longo, 2 mm. lato, minute 4-lobato; petalis singillatim caducis; staminibus brevibus; fructibus immaturis depresso globosis 5 mm. diametro.

NETHERLANDS NEW GUINEA: Bele River, 18 km. northeast of Lake Habbema, Brass & Versteegh 11156 (TYPE), 11134, November 1938, alt. 2400 m. and 2300 m., primary forest (tree 20–21 m. high, 33–34 cm. diameter; bark brown; flowers white; young fruit green, older ones violet).

When there is opportunity to examine the type, these collections may be found to belong to *Syzygium benjaminum* Diels. However, there are several characters in which our material is at variance with Diels's scanty description. The branchlets are definitely 4-angled, the leaves are larger (but vary greatly in size), copiously pellucid-punctate, and longer petiolate, and the flowers are not stipitate.

***Syzygium myriadenum*** sp. nov.

Arbor magna; ramulis nigrescente-brunnescentibus cortice crebre rimosis non desquamatis, novellis brunnescentibus valde compressis vix angulatis; foliis chartaceis, in sicco olivaceis crebre minuteque glanduloso-punctatis utrinque manifeste reticulatis, oblanceolatis, 10–13 cm. longis, 4–5 cm. latis, basi longe angustatis acutis vel acuminatis apice obtusis vel subrotundatis, costa supra impressa subtus elevata, nervis numerosis tenuibus utrinque distincte manifestis in venam intramarginalem 1.5–3 mm. a margine conjunctis; petiolo 1.5–2 cm. longo; inflorescentiis terminalibus,  $\pm$  7 cm. longis, a basi ramosis, ramis compressis, ramulis 4-angulatis; bracteis brevissimis latis inconspicuis; floribus non visis; fructibus in sicco irregulariter saepissime longitudinaliter corrugatis oblongis vel subovoideis, 1 cm. longis,  $\pm$  5 mm. diametro, apice calycis lobis 4 (1 mm. longis, 2 mm. latis) coronatis.

SOLOMON ISLANDS: Guadalcanal: Sorvorhio Basin, *Kajewski* 2713 (TYPE), January 1932, alt.  $\pm$  180 m., common in rain-forest (large sized tree up to 18 m. high, with fibrous bark; wood light brown, heavy; fruit red when ripe, about 1.3 cm. long, 7 mm. diameter).

The outline of the leaves and their venation somewhat resemble *Syzygium micrandrum* (Ridl.) comb. nov. (*Eugenia micrandra* Ridl. Trans. Linn. Soc. Bot. II. 9: 48. 1916); but, the leaves are much thinner in texture, the fruit is red, and the wrinkled pericarp indicates a soft perhaps spongy texture in the flower. Although we have not seen the fruit of *Syzygium micrandrum*, the flower suggests a fruit of firmer texture.

*Syzygium obtusum* sp. nov.

Arbor  $\pm$  23 m. alta; ramis teretibus brunnescentibus, ramulis compressis vix angulatis; foliis coriaceis impellucidis, in sicco supra brunneis vel atro-brunneis subtus pallidioribus crebre minuteque atro-glandulosis, obovatis, 2.5–6.5 cm. longis, 1–4 cm. latis, basi cuneatis apice rotundatis margine anguste revolutis, costa supra canaliculata subtus prominente, nervis primariis utrinsecus 10–15 subpatentibus, utrinque inconspicuis vel subobscuris in venam intramarginalem  $\pm$  2 mm. a margine confluentibus, reticulo nullo; petiolo 5 mm. longo; inflorescentiis terminalibus 7–9 cm. vel ultra longis latisque, ramulis subangulatis; floribus immaturis sessilibus; bracteis non visis; alabastris turbinatis 4.5 mm. longis, apice 2.5 mm. diametro; calycis tubo minute 4-dentato.

NETHERLANDS NEW GUINEA: Bernhard Camp, Idenburg River, *Brass & Versteegh* 14030 (TYPE), April 1939, alt. 75 m., frequent in the primary rain-forest of lower mountain slopes (tree 23 m. high, 48 cm. diameter; bark dark brown, scaly; flower-buds red); Babo, *Neth. Ind. For. Service* bb.21810.

The species belongs in the same complex with *Syzygium ganophyllum* Diels but the leaf-venation on both surfaces is readily seen with the naked eye; perhaps it is also close to *S. leucoderme* Diels, but the bark is darker in color.

*Syzygium retivenium* sp. nov.

Arbor 31 m. alta, 50 cm. diametro; ramis decorticatis cortice inter nodos rimoso interrupto; ramulis basi petioli deorsum utrinque decurrente inconspicue subalatis atrofusis; foliis rigide coriaceis, in sicco supra brunnescentibus  $\pm$  punctatis subtus pallidioribus utrinque subprominule crebre reticulatis oblongis, 2–4 cm. longis, 0.7–1.5 cm. latis, utrinque subaequaliter angustatis basi cuneatis vel acutis apice acutiusculis vel obtusis margine recurvatis, costa supra canaliculata subtus prominente, nervis primariis saepius furcatis utrinsecus circiter 15, in reticulo supra subtusque prominulo inconspicuis, vena intramarginali  $\pm$  0.5 mm. a margine remota; petiolo 2.5–3 mm. longo; inflorescentiis immaturis terminalibus, foliis in bracteas abeuntibus foliatis; floribus sessilibus apice ramulorum cymosis; alabastris immaturis circiter 3 mm. longis bracteis fere obtectis; calycis tubo obconico, lobis 4 parvis.

NETHERLANDS NEW GUINEA: 18 km. southwest of Bernhard Camp, Idenburg River, *Brass & Versteegh* 11989 (TYPE), February 1939, alt. 1990 m., common on slopes in primary rain-forest (tree 31 m. high, 50 cm. diameter; bark 8 mm. thick, brown, flaking off in large scales; flower-buds green).

Amongst the described species of *Syzygium* this seems nearest to *S.*



*homichlophilum* Diels which also has a leafy inflorescence and obviously reticulate leaves. From the description of Diels's species it appears to have larger somewhat differently shaped leaves, longer petioles, and more flowers at the apex of the branchlets. In the specimen here cited the inflorescence protrudes beyond the leaves.

*Syzygium sylvanum* (Ridl.) comb. nov.

*Eugenia sylvana* Ridl. Trans. Linn. Soc. Bot. II. 9: 48. 1916.

NETHERLANDS NEW GUINEA: 15 km. southwest of Bernhard Camp, Idenburg River, *Brass & Versteegh* 11978, January 1939, alt. 1500 m., primary forest (tree 19 m. high; flower-buds reddish); 6 km. southwest of Bernhard Camp, Idenburg River, *Brass & Versteegh* 12543, 12552, February 1939, alt. 1170 m. and 1150 m., occasional in primary forest (tree 26–33 m. high; fruits white). NORTHEASTERN NEW GUINEA: Ogeramnang, *Clemens* 4692, December 1936, alt.  $\pm$  2360 m.

*N. Leaves acuminate.*

*Syzygium attenuatum* (Miq.) Merr. & Perry, Mem. Am. Acad. Arts Sci. 18(3): 185 (Mem. Gray Herb. 4: 185). 1939.

*Jambosa attenuata* Miq. Fl. Ind. Bat. 1(1): 437. 1855.

NETHERLANDS NEW GUINEA: 4 km. southwest of Bernhard Camp, Idenburg River, *Brass & Versteegh* 13123, March 1939, alt. 850 m., frequent in primary rain-forest of plains (tree 20 m. high, 46 cm. diameter; bark 11 mm. thick, brown, scaly; fruit light green). BRITISH NEW GUINEA: Oroville Camp, Fly River, *Brass* 7422, August 1936, common in rain-forests (large canopy tree with somewhat flaky fibrous brown bark and hard brown wood; flowers white). NORTHEASTERN NEW GUINEA: Sattelberg, *Clemens* 1853, 2220, February–April 1936, alt.  $\pm$  1050 m.

These collections differ slightly from the Malaysian material which we have so named. The leaf is more shortly obtuse-acuminate and the flowers at the apex of the branches are not so obviously umbellate; nevertheless, we have not yet found sufficiently tangible differences to regard this material as specifically different from that of Malaysia.

*Syzygium Buettnerianum* (K. Schum.) Niedenzu in Engler & Prantl, Nat. Pflanzenfam. 3(7): 85. 1893; Diels, Bot. Jahrb. 57: 406. 1922.

*Eugenia Buettneriana* K. Schum. Fl. Kaiser Wilhelms Land 89. 1889.

NETHERLANDS NEW GUINEA: Hollandia, *Neth. Ind. For. Service* bb.28981, August 1939. NORTHEASTERN NEW GUINEA: Ogeramnang, *Clemens* 4492, 5013, December 1936, January 1937, alt. 1700–1800 m. BRITISH NEW GUINEA: Gaima, Lower Fly River (east bank), *Brass* 8314, common in rain-forests (large profusely flowering canopy tree; bark brown, thick, fibrous, deeply fissured; leaf-margins slightly recurved; flowers purple with red stamens).

This species was described from Northeastern New Guinea. These collections appear to suit the description fairly well. The two Clemens collections are very similar to the others except that the leaves are strongly and finely reticulate on both surfaces, and the epidermis of the branchlets of the inflorescence does not appear to scale off in small flakes.

*Syzygium finisterrae* (Lauterb.) comb. nov.

*Eugenia finisterrae* Lauterb. Rep. Sp. Nov. 13: 240. 1914.

NORTHEASTERN NEW GUINEA: Wareo, *Clemens* 1420, January 1936, alt.  $\pm$  600 m.; Yunzaing, *Clemens* 3004, 4193, April 1936, alt.  $\pm$  1350 m. alt.

The inflorescence in these collections is smaller than in the description of the type but otherwise they seem to agree with the description.

*Syzygium leptanthum* (Wight) Niedenzu in Engl. & Prantl, Nat. Pflanzenfam. **3**(7): 85. 1893; Lauterb. Nov. Guin. **8**: 322. 1910; Diels, Bot. Jahrb. **57**: 403. 1922.

BRITISH NEW GUINEA: Lake Daviumbu, Middle Fly River, *Brass* 7567, August 1936, rain-forest: the chief component of a narrow fringe community occupying shallow margins of lake (low spreading tree 5–6 m. high, producing adventitious roots from trunk and branches; fruit black, fleshy), *Brass* 7658, September 1936 (flowering material of 7567; flowers white); Upper Wassi Kussa River, *Brass* 8605, January 1937, rain-forest (small tree 5 m. high overhanging river; fruit black, acid).

This is probably the species which Greves, Jour. Bot. **61**: Suppl. 18. 1923, reported as representing *Eugenia claviflora* Roxb. These species and those closely related all need to be examined as to types, distinguishing features and geographic ranges. Until such time as this can be done, the specific concepts cannot well be delineated.

*Syzygium onesimum* sp. nov.

Arbor  $\pm$  25 m. alta; ramulis teretibus brunnescentibus; foliis tenuiter coriaceis vel chartaceis, in sicco supra saturato-brunneis subnitidis subtus pallidioribus sub lente reticulatis impellucidis, lanceolatis vel anguste ovatis, 7–12 cm. longis, 2.3–4 cm. latis, basi rotundato-cuneatis apice sensim vel interdum subabrupte longe acuminatis, acumine 1.5–2 cm. longo, costa supra canaliculata subtus subcarinata, nervis primariis numerosis patentibus supra manifestis vel subobscuris subtus distincte manifestis non prominulis in venam intramarginalem 1–1.5 mm. a margine confluentibus, venis secundariis fere primariis aequalibus; petiolo 5–8 mm. longo; inflorescentiis terminalibus usque 5 cm. longis basi cymoso-ramosis, ramis ramulisque  $\pm$  compressis angulatis, bracteis caducis; floribus 1–3 apice ramulorum sessilibus; alabastris clavatis vel anguste turbinatis subangulatis 4 mm. longis, apice circiter 2 mm. diametro; calycis tubo 3–3.5 mm. longo, 4-dentato; petalis calyptram convexam formantibus; staminibus 3–4 mm. longis; fructibus non visis.

SOLOMON ISLANDS: Bougainville: Koniguru, Buin, *Kajewski* 2043 (TYPE), 2091, August 1930, alt. 850 m. and 1000 m., common in rain-forest (medium to tall tree 25 m. high; stamens white, very numerous; occasionally found as a parasite in a similar manner to a fig). V s a b e l: Tataba, *Brass* 3445, January 1933, alt. 50 m., rain-forest ridges (slender tree 20 m. tall; brown uneven bark, red within, falling in large flakes; hard brown wood; leaves with midrib pale on both surfaces; flowers white).

*Brass* 3445 differs from the type-collection in that the twigs are cinereous and the leaves are much longer petiolate (petiole 1–1.8 cm. long), the venation of the leaves is less marked but the inflorescence is only in young bud, so we believe this is the best disposition of the collection at present. The species is somewhat like *Eugenia striata* Koord. & Val. Atlas Baumart. Java **3**: fig. 501, E–K. 1915, but the flowers are a little smaller and hardly (if at all) stipitate at the base.

*Syzygium plumeum* (Ridl.) comb. nov.

*Eugenia plumea* Ridl. Trans. Linn. Soc. Bot. II. **9**: 46. 1916.

NORTHEASTERN NEW GUINEA: Ogeramngang, *Clemens* 5450, 5459, February 1937, alt.  $\pm$  1800 m.; Yoangen, *Clemens* 6599, June 1937, alt. 1600 m.

The species was described from Netherlands New Guinea.

**Syzygium rostratum** (Blume) DC. Prodr. **3**: 261. 1828.

*Calyptranthus rostrata* Blume Bijdr. 1092. 1826.

NETHERLANDS NEW GUINEA: Hollandia, *Neth. Ind. For. Service* bb.25064, July 1938, alt. 50 m.

A species previously recorded from Sumatra, Java and Borneo. It is quite probable that the following sterile collections from Seroei, Biak Island, also belong here: *Neth. Ind. For. Service* bb.30677, bb.30682, bb.30688, bb.30747, bb.30750, bb.30826.

**Syzygium subcorymbosum** sp. nov.

Arbor gracilis 25 m. alta; ramis cortice rimosis; ramulis teretibus, novellis compressis sulcatis brunnescentibus; foliis coriaceis impellucidis, in sicco supra subnitidis atro-brunneis subtus fere cupreo-brunnescentibus, ellipticis, 5.5–7 cm. longis, 3–4 cm. latis, utrinque subrotundatis basi late cuneatis apice abrupte breviterque acuminatis, acumine  $\pm$  5 mm. longo obtuso, costa supra subcanaliculata subtus prominente, nervis primariis numerosis (supra lamina striolata) subtus cum secundariis atque reticulo inconspicuis subobscuris; petiolo 3–5 mm. longo; inflorescentiis terminalibus fere a basi ramosis 8 cm. longis, 15 cm. latis subcorymbosis; floribus sessilibus, bracteis caducis; calycis tubo 7–9 mm. longo, apice 4 mm. diametro, infero substipitiforimi supero subcampanulato subaequilongo, margine 5-dentato; petalis calyptram convexam formantibus caducis; staminibus fere 1 cm. longis; fructibus ignotis.

BRITISH NEW GUINEA: Central Division, Kubuna, *Brass* 5573 (TYPE), November 1933, alt. 100 m., forest on low ridges (slender tree 25 m. high; grey slightly scaly bark; leaves glossy; flowers white).

The general habit of this species suggests *Syzygium inophylloides* (A. Gray) C. Muell. of Samoa, but the flowers are much larger. Among the Papuan species, *Brass* 5573 is perhaps nearest to *Syzygium leptophlebium* Diels, nevertheless, in his description Diels emphasizes the length of the petiole "(pro genere) longus," which here is rather short. Whether this is an unusual variation or a specific difference can only be determined with more material and the privilege of examining the type.

ARNOLD ARBORETUM,

HARVARD UNIVERSITY.



STUDIES IN THE THEACEAE, XII  
NOTES ON THE SOUTH AMERICAN SPECIES OF  
TERNSTROEMIA

CLARENCE E. KOBUSKI

SINCE the type species, *Ternstroemia meridionalis* Mutis ex Linnaeus f., was first described in 1781, well over a hundred entities from tropical America have been accredited to this genus. Two regional studies have been published on these American species. In 1866 Wawra discussed the Brazilian and closely related species in Martius, *Flora Brasiliensis*, and in 1896 Urban, in *Botanische Jahrbücher*, offered his excellent treatment of the West Indian species.

At the suggestion of some of my colleagues, I borrowed from several of the leading American herbaria all the available material (American) of *Ternstroemia* in the hope of preparing a monographic treatment of this genus. Although knowing full well that many of the types were deposited in European herbaria and that these specimens would not be available for this work, I had hoped that I might find sufficient authentic representative material in America to offset this lack of European types. I soon discovered my error. When the very early species were described, the authors were exceedingly brief in their descriptions, stressing only the most obvious characters, not realizing that these obvious characters such as "leaves coriaceous, obovate-elliptic, tapering at the base into a petiole" would fit nearly every species already described and those to be described later. Fortunately, in the material borrowed from the Field Museum of Natural History (FM) were photographs of many of the missing types. Although the "concealed" characters such as petals, stamens, ovary, style and stigma could not be discerned, without these photographs the present study would have been impossible. To the far-seeing individuals who prepared these photographs, I am very grateful. Aiding equally were the type and otherwise authentic material from the Gray Herbarium (G), the herbaria of the New York Botanical Garden (NY), Missouri Botanical Garden (Mo), and the United States National Museum (US). To these institutions also I am much indebted. Although this brief study may not take on the noble title of monograph, I hope that the amplified descriptions with notes on specific relationships, the citations of literature and specimens and the synonymy may prove of assistance to workers in the various regions of South America. A second paper will be published in the near future dealing with the North American species of the genus.

The genus *Ternstroemia* was first proposed by Mutis in Linnaeus f., *Supplementum Plantarum*, 39. 1781. Various other names have been applied to this genus, such as *Taonabo* Aublet (1775), *Dupinia* Scoparius (1777), *Hoferia* Scoparius (1777), *Tonabea* Jussieu (1789), *Amphania*

Banks (1821), *Reinwardtia* Korthals (1840), *Llanosia* Blanco (1845), *Erythrochiton* Schlechter (1846), *Voelckeria* (1847) and *Mokofua* Kuntze (1891). *Taonabo* is the *nomen prius* of this group of synonyms and until a few years ago was used by several of the American botanists who followed the rule of strict priority laid down by the American Code of Nomenclature. However, the name *Ternstroemia* has been adopted by the members of the Congress of the International Code of Nomenclature as one of the "nomina conservanda" and the name *Taonabo* listed as "nomina rejicienda" thus ending any controversy which might have existed over the correct name.

### **Ternstroemia** Mutis ex Linnaeus f.

Flowers hermaphroditic; sepals 5, rarely 6, imbricate, persistent. Petals 5, rarely 6, free to base, connate to middle or above the middle, very rarely to the apex, approaching cleistogamy, when free more or less imbricate. Stamens 25–300. 2- rarely few- or 1-seriate; filaments connate, the outer filaments adnate to the base of the petals; anthers usually longer than the filaments, rarely shorter, oblong or linear, the connective usually projected into an apiculate or caudate appendage, rarely mucous. Ovary 2-, 3-, rarely 1-loculate or, with accessory septa, 4–6-loculate, the ovules in each locule 2–20, rarely solitary, pendulous from the apex of the placenta on a more or less evolute funiculus. Style 1, entire or rarely deeply 2–3-parted; stigma or stigmata minutely punctiform or evolute, entire or lobate. Fruit indehiscent, rarely dehiscent at the apex into valves or by a circumscissile layer near the base. Seeds few; testa opaque, smooth, rarely plicate-rugulose, yellow, often covered with brown, many-celled papilli.

Glabrous trees or shrubs with the branches often subopposite or verticillate. Leaves spirally disposed, congested or verticillate at the apex of the current year's growth, usually coriaceous, rarely chartaceous or membranaceous, entire, subentire or rarely truly dentate. Flowers axillary, solitary, bracteolate, the bracteoles 2, rarely 4, opposite or subopposite, placed immediately beneath calyx, rarely with one somewhat removed on pedicel.

TYPE SPECIES: *Ternstroemia meridionalis* Mutis ex Linnaeus f.

### KEY TO THE SOUTH AMERICAN SPECIES

- A. Fruit a dehiscent capsule.
  - B. Fruit with circumscissile dehiscence at the base (Bolivia) . . . 1. *T. circumscissilis*.
  - BB. Fruit dehiscing at the apex into four valves (Brazil) . . . . . 2. *T. dehiscentis*.
- AA. Fruit an indehiscent capsule.
  - B. Ovary 4-loculate, loculi 1-seeded. (See also under BBBB).
  - C. Leaves distinctly dentate, dark-punctate on lower surface. . . 34. *T. dentata*.
  - CC. Leaves entire (or finely serrulate), not punctate on lower surface.
    - D. Stigma punctiform.
      - E. Pedicels short, 0.5–0.7 cm. long; leaves obtusely acuminate at the apex, subrotund at the base; petiole 5 mm. long (Brazil) . . . . . 3. *T. borbensis*.
    - EE. Pedicels 1.5–3.0 cm. long; leaves obtuse but not acuminate at the apex, subrotund at the base; petiole 10 mm. long. . . 36. *T. laevigata*.
  - DD. Stigma peltate, sometimes 4-crenate.
    - E. Style minute, 1 mm. or less long. . . . . 10. *T. brevistyla*.
    - EE. Style 4 mm. long in flower, 7 mm. long in fruit. . . 29. *T. oligostemon*.
- BB. Ovary 1-loculate.
  - C. Leaves 18–21 cm. long, 7–8 cm. wide (British Guiana) . . . 4. *T. Gleasoniana*.
  - CC. Leaves 3–5 cm. long, 1.2–2.5 cm. wide (Venezuela) . . . . . 5. *T. discoidea*.

## BBB. Ovary 3-loculate.

- C. Style 3-parted (British Guiana, Dutch Guiana, Venezuela, Brazil).....6. *T. punctata*.

## CC. Style entire.

- D. Sepals and bracteoles entire and scarious-margined, not glandular-denticulate.

- E. Pedicels short, 4-7 mm. long, 2-3 mm. thick; petals 10-11 mm. long, 6-8 mm. wide .....24. *T. camelliaefolia*.

- EE. Pedicels 10-25 mm. long, slender, graceful; petals 5-6 mm. long, 2-4 mm. wide.

- F. Leaves membranaceous, veins conspicuous; stigma subcapitate, tri-crenate (French Guiana, Trinidad).....7. *T. delicatula*.

- FF. Leaves coriaceous, veins obscure; stigma punctiform (British Guiana) .....8. *T. Browniana*.

## DD. Sepals and bracteoles glandular-denticulate on the margin.

- E. Stigma subcapitate, crenate, usually 3-crenate.

- F. Style minute, hardly equalling the ovary in length, or shorter.

- G. Leaves 10-12 cm. long, 4-5 cm. wide, nigro-punctate beneath, the veins (ca. 7 pairs) evident; pedicels 1.5-2.0 cm. long (Brazil).....9. *T. alnifolia*.

- GG. Leaves 3-5 cm. long, 2-3 cm. wide, not punctate below, the veins not evident; pedicels 6-8 mm. long (Venezuela).....10. *T. brevistyla*.

## FF. Style longer than the ovary (3-4 mm. +).

- G. Fruit large, up to 2.5 cm. long and 2 cm. diameter; pedicels 2.5-4.5 cm. long, 4-5 mm. diameter; leaves oblong-obovate, up to 16 cm. long.....23. *T. macrocarpa*.

- GG. Fruit not over 1.2 cm. long and the same diameter; pedicels ca. 1 cm. long; leaves cuneate, up to 6 cm. long.....46. *T. cuneifolia*.

## EE. Stigma punctiform.

- F. Leaves acuminate at apex; connective of stamens prolonged into a caudate appendage 1-2 mm. long; petals connate at base for one-half or more their entire length.

- G. Pedicels up to 4 cm. long; bracteoles 5-8 mm. long.

- H. Leaves 12-16 cm. long with 20-30 pairs of veins; pedicels very slender, pendulous from base (Peru).....11. *T. penduliflora*.

- HH. Leaves 7-10 cm. long with 7-8 pairs of veins; pedicels sturdy, erect (Brazil).....12. *T. Candolleana*.

- GG. Pedicels 1.0-1.5 cm. long; bracteoles 0.7-1.4 mm. long (Brazil).....13. *T. subcaudata*.

- FF. Leaves obtuse at apex; petals connate at base but less than one-half the entire length; connective of stamen prolonged into a short apicule.

- G. Petiole 6-7 mm. long; pedicels 7-8 mm. long; leaves obovate, up to 7 cm. long and 3 cm. wide (British Guiana).....14. *T. Schomburgkiana*.

- GG. Petiole 10-15 mm. long; pedicel up to 25 mm. long; leaves oblong-obovate to lanceolate, 6-13 cm. long, 2.0-4.5 cm. wide (Brazil) .....15. *T. brasiliensis*.

## BBBB. Ovary 2-loculate.

- C. Corolla calyptrate, cleistogamous or nearly so, the corolla-walls thickened.

- D. Corolla opening by minute pore at apex, the lobes minute (ca. 1 mm. long and wide), the walls 1 mm. thick (Peru).....16. *T. globiflora*.



- DD. Although petal outlines distinguishable, apparently cleistogamous, a thickened band (1 mm. deep) at base (Colombia) . . . 17. *T. congestiflora*.
- CC. Petals free, at least to near the middle, membranaceous.
- D. Style 2-parted.
- E. Leaves small, not over 7 cm. long and 1.5 cm. wide.
- F. Leaves elliptic-lanceolate, 4.5–6.5 cm. long, 1.0–1.5 cm. wide, the petiole 5–7 mm. long; sepals small, semi-orbicular, 3–5 mm. long, ca. 4 mm. wide (Venezuela) . . . 18. *T. distyla*.
- FF. Leaves cuneate, 2.5–3.0 cm. long, 1.0–1.3 cm. wide, sessile; sepals long-attenuate, sharp-pointed, 13–15 mm. long, ca. 5 mm. wide at base (Venezuela) . . . 19. *T. tristyla*.
- EE. Leaves very large, 13–19 cm. long, 5–8 cm. wide (British Guiana) . . . 20. *T. grandiosa*.
- DD. Style entire.
- E. Outer calyx-lobes entire, scarious-margined, not glandular-denticulate; bracteoles may or may not be glandular-denticulate, if so, sparsely.
- F. Fruit unusually large, 2–4 cm. long, 2–4 cm. wide.
- G. Fruit 1–2-seeded; seeds ca. 3 cm. long, 1.5 cm. diameter, covered with a reddish brown crusty surface when dry (Brazil) . . . 21. *T. Krukoffiana*.
- GG. Fruit 5–18-seeded, seeds not over 1 cm. long, surface smooth.
- H. Pedicel 25–45 mm. long, 4–5 mm. diameter at apex; calyx-lobes 9–13 mm. long, 10–15 mm. wide.
- I. Pericarp very thick, 4–6 mm. wide, porous or spongy; septa in fruit indistinguishable; bracteoles suborbicular, immediately below calyx (Peru) . . . 22. *T. pachytricha*.
- II. Pericarp shell-like; septa in fruit clearly defined; bracteoles triangular, 5–7 mm. below calyx on pedicel (Colombia) . . . 23. *T. macrocarpa*.
- HH. Pedicels short, 4–7 mm. long, 2–3 mm. diameter; calyx-lobes 5–8 mm. long, 7–8 mm. wide (Venezuela) . . . 24. *T. camelliaefolia*.
- FF. Fruit normal-sized (ca. 1.5 cm. or less long and as wide).
- G. Leaves linear-oblongate, 3–5 cm. long, 0.4–0.6 cm. wide; stigma punctiform; stamens with caudate appendages 1 mm. or more long (Venezuela) . . . 25. *T. duidae*.
- GG. Leaves oblong-obovate to elliptic, never less than 1 cm. wide; stigma peltate or bi-crenate; stamens with mucous or slightly apiculate appendages.
- H. Flowers large, ca. 2 cm. or more across; petals up to 12 mm. long, united for 3–4 mm. at base into a tube; stamens 125–200.
- I. Pedicels 15–17 mm. long, sturdy; leaves 8–10 cm. long, 3.5–4.5 cm. wide, with stout petiole 5–10 mm. long (Ecuador) . . . 26. *T. Lehmannii*.
- II. Pedicels 5–10 mm. long, compressed; leaves small, 2–4 cm. long, 1.5–2.0 cm. wide, with short petiole 3–5 mm. long or shorter (Colombia) . . . 27. *T. meridionalis*.
- HH. Flowers less than 1 cm. across; petals not over 5–7 mm. long, not united into a conspicuous tube.

- I. Leaves oblong-obovate to elliptic, the margin entire or subentire, the apex not generally retuse.
  - J. Petiole very short, ca. 3 mm. long; filaments crassate (Peru).....28. *T. Jelskii*.
  - JJ. Petioles longer, 8–14 mm. long; filaments filiform (Trinidad).....29. *T. oligostemon*.
- II. Leaves cuneate, the margin distinctly crenate, the apex consistently retuse (Venezuela).....30. *T. retusifolia*.
- EE. Outer calyx-lobes and bracteoles distinctly glandular-denticulate.
  - F. Style 2-parted for approximately half its length (Venezuela).....31. *T. pungens*.
- FF. Style entire.
  - G. Stigma punctiform.
    - H. Style unusually long, up to 10 mm.
      - I. Leaves completely revolute to midrib, subsessile, the petiole 1–2 mm. long (Venezuela).....32. *T. dura*.
      - II. Leaves flat, revolute only at margin, the petiole ca. 5 mm. long (Brazil).....33. *T. oleaeifolia*.
  - HH. Style seldom over 5–6 mm. long.
    - I. Leaves distinctly dentate; connective of anthers projected for 2 mm. or more into a distinct caudate appendage (Brazil, French Guiana)....34. *T. dentata*.
    - II. Leaves entire or crenulate, never dentate; connective never projected into an appendage measuring more than 1 mm. in length.
      - J. Branchlets angled; leaves membranaceous, 2.5–3.0 cm. long, 1.0–1.5 cm. wide; veins (4–5 pairs) reticulate below (Peru).....35. *T. brachypoda*.
      - JJ. Branchlets terete; leaves coriaceous, up to 6 cm. or over (4 cm. in *T. verticillata*); veins, if evident, not reticulate.
        - K. Stamens equalling the corolla in length; petals connivent at apex, crisp (British Guiana).....36. *T. laevigata*.
        - KK. Stamens included within the corolla; petals obtuse or spreading at apex, not connivent.
          - L. Stamens numbering over 300, the connective plane or mucous at the apex of the anther, not projected into an apicule (Bolivia).....37. *T. polyandra*.
          - LL. Stamens numbering 100 or less, the connective projected at the apex of the anther into an apiculate appendage.
            - M. Petals joined for two-thirds or more from the base into a "tube."
              - N. Leaves obovate to cuneate-oblong, 2–4 cm.  $\times$  1–2 cm., truncate or retuse at apex, with petiole up to 5 mm. long (British Guiana)....38. *T. verticillata*.
              - NN. Leaves oblong-obovate, 6–8 cm.  $\times$  2.5–3.5 cm., abruptly acuminate at

- apex, with petiole ca. 10 mm. long (Peru).....39. *T. Klugiana*.
- MM. Petals joined only at the base, not forming a "tube."
- N. Bracteoles ovate, ca. 4 mm. long; filaments compressed, very short, less than 1 mm. long (Brazil)....40. *T. carnosae*.
- NN. Bracteoles minute, 1-2 mm. long; filaments filiform, 1.5-3.0 mm. long.
- O. Leaves often asymmetrical, epunctate below; calyx-lobes 4-5 mm. long, 4-5 mm. wide; connective hardly muticous (Bolivia) .....41. *T. asymmetrica*.
- OO. Leaves symmetrical, dark-punctate below; calyx-lobes 7-10 mm. long, 5-7 mm. wide; connective subacuminate (Colombia) .....42. *T. clusiaefolia*.
- GG. Stigma peltate, subcapitate or crenulate.
- H. Pedicels 4-6 cm. long.
- I. Leaves elliptic, acute at both ends, submembranaceous; calyx-lobes orbicular, ca. 5 mm. long (British Guiana) .....43. *T. longipes*.
- II. Leaves obovate, obtuse or rounded at apex, coriaceous; calyx-lobes small, 2.5-3.5 mm. long, ca. 2.5 mm. wide (British Guiana).....44. *T. crassifolia*.
- HH. Pedicels up to 2.5 cm. long.
- I. Leaves seldom over 2.5 cm. long; pedicels 2.5 cm. long, equalling the leaves in length (Peru).....45. *T. quinquepartita*.
- II. Leaves up to 6-10 cm. long; pedicels much shorter in comparison.
- J. Leaves cuneate, obtuse and retuse at apex (Brazil) .....46. *T. cuneifolia*.
- JJ. Leaves oblong-elliptic, obovate or oblanceolate, not cuneate; acuminate at apex.
- K. Leaves sharply serrate or subserrate with conspicuous veins (10 pairs) and reticulations below; bracteoles rounded (Bolivia).....47. *T. subserrata*.
- KK. Leaves entire or subentire with veins not evident; bracteoles triangular.
- L. Pedicels very short, 5-8 mm. long; calyx-lobes minute, 2-3 mm. long, 1.5-2.0 mm. wide; petals most minute, shorter than the calyx-lobes; style very short, 0.8 mm. long (Colombia).....48. *T. Killipiana*.
- LL. Pedicels slender, 15-25 mm. long; calyx-lobes 6-8 mm. long, 4-5 mm. wide; petals 8-9 mm. long; style 1.5 mm. long (Colombia).....49. *T. Mutisiana*.



**1. *Ternstroemia circumscissilis*, sp. nov.**

Arbor 15 metralis, ramulis griseis teretibus. Folia oblongo-obovata, 10–15 cm. longa et 4–7 cm. lata, coriacea, apice obtuse acuminata vel rotundata, basi cuneata, undique nitida et granuloso-punctata, margine revoluta, integerrima vel subcrenolata, costa supra canaliculata, subtus elevata, nervis (ca. 10 paribus) subinconspicuis, petiolis 1.5–2.0 cm. longis. Flores solitarii, pedicellis 1.5–2.0 cm. longis, gracilibus, bracteolis 2, oppositis late ovato-triangularibus inaequalibus  $4 \times 4$  mm. et  $2.5 \times 2.5$  mm. glanduloso-denticulatis; sepala 5, imbricata, suborbicularia, pergamentacea, subaequalia, 5.5–7.0 mm. longa et circa 6 mm. lata, margine subscariosa vel scariosa, non glanduloso-denticulata; petala 5 vel 6, membranacea, (5–)7–8 mm. longa et 5.0–5.5 mm. lata, apice rotundata, basi 3 mm. connata; stamina bi-seriata, circa 70, circa 4 mm. longa, filamentis 2 mm. longis gracilibus, basi connatis et ad corollam adnatis, antheris linearibus ca. 2 mm. longis, connectivo subacuminato; ovarium conicum, 2 mm. longum, 2(3–?)-loculare, loculis pauci-ovulatis, stylo circa 2 mm. longo, stigmate peltato 1 mm. vel plus diametro. Fructus conicus pentagonus, 1–2 cm. longus, basi 1–2 cm. diametro, 2–3-loculatus, seminibus 4 in loculis 2, epicarpio (ut videtur) indurato ad 5 mm. crasso, basi optime circumscissili; seminibus complanatis, ca. 7 mm. longis.

DISTRIBUTION: Bolivia.

BOLIVIA: Dept. La Paz, Prov. Larecaja, Copacabana (about 10 km. south of Mapiro), alt. 850–950 m., *B. A. Krukoff 11065* (TYPE, AA; ISOTYPE, NY), Oct.–Nov. 1939 (tree 50 ft. high). — Mapiro, alt. 1500 m., *H. H. Rusby 486* (FM, G, Mo, NY, US), April 1886. — Mapiro Region, San Carlos, on way to San José, alt. 800 m., *O. Buchtien 895* (NY, US), Apr. 12, 1927. — Mapiro Region, San Carlos, alt. 750 m., *O. Buchtien 2082*, Sept. 1907.

The circumscissile dehiscence at the extreme base of the fruit is the outstanding character of this species. At dehiscence the fruit separates by a distinct cleavage line into a conical pentagonal cap (comprising most of the fruit) and the flat base. On the inside of the base, after separation, can be found the locular depressions showing the number of cells, which may vary from 2 to 3 on a single herbarium specimen. In the flowers examined only 2-celled ovaries were found. However, only a very few floral dissections were made because of the paucity of flowering material. The persistent calyx increases in size until in fruit it measures as much as 2 cm. across. In this respect it resembles some of the Polynesian species.

**2. *Ternstroemia dehiscens* Huber in Bull. Soc. Bot. Genève, sér. 2, 6: 189. 1915.**

DISTRIBUTION: Brazil.

BRAZIL: State of Pará, in field near Ariramba river, *A. Ducke 8032* (photo and fragment of TYPE, FM), Dec. 21, 1906.

Low shrub with gray branchlets. Leaves subcoriaceous, obovate, 5–7 cm. long, 2.0–3.5 cm. wide, obtuse at apex, often long acuminate, narrowed at base into a slender petiole 1 cm. long, the margin entire or obscurely denticulate, shining above, opaque below, the veins indistinct. Flowers axillary, solitary, with pedicels 1 cm. long; bracteoles semi-orbicular, ovate, minutely apiculate; sepals subequal, 4 mm. long, orbicular, with the inner lobes narrower, the outer lobes hardly glandular-denticulate; petals with subentire margins; stamens caudate; ovary 4-celled, the style equal to the ovary in length; the stigma minute [probably punctiform]. Fruit yellow,

ovoid-globose, 13 mm. long, 11 mm. diam., abruptly contracted into a style 5 mm. long, dehiscing into 4 pergamentaceous valves with involute margins, a central tetragonal columella persisting. Seeds cuneate-oblong, 7 mm. long, reddish.

Only a photograph and fragment of the type of this species were available for study. The outstanding character is the dehiscent capsule. The author remarks that when the style drops off, the capsule splits "subregulariter" into four pergamentaceous valves with involute margins. A central tetragonal columella persists. The photograph of the type shows a single capsule with four spread valves. Not having actually seen this specimen or one like it, I must refrain from making critical comments concerning this startling character.

3. *Ternstroemia borbensis*, sp. nov.

Frutex parvus, ramulis teretibus argenteis. Folia coriacea, elliptica vel obovata (marginibus imparibus), 5.0–8.5 cm. longa, 2–4 cm. lata, apice obtusa vel obtuse acuminata, basi subrotundata, margine serrata, plana, saepe ad basim subrevoluta, supra nitida, subtus opaca, costa supra canaliculata, subtus elevata, venis obscuris, petiolis 5 mm. longis. Flores solitarii, rosei, apice ramulorum positi, pedicellis 5–7 mm. longis recurvis, bracteolis 2 oppositis triangulari-ovatis circiter 1 mm. longis et basi 1 mm. diametro glanduloso-denticulatis; sepala 5, imbricata, inaequalia, pergamentacea, exterioribus lato-ovatis brevibus 4–5 mm. longis et 2.2–3 mm. latis, sparse glanduloso-denticulatis, interioribus obovatis circiter 5 mm. longis et 4.0–4.5 mm. latis; petala 5, ovata, 4.5–5.0 mm. longa, basi 2.5–3.0 mm. connata; stamina circiter 30, bi-seriata, inaequalia, antheris circiter 1.5 mm. longis, interiorum filamentis gracilibus circiter 1 mm. longis, exteriorum crassis 0.5 mm. vel minus longis, connectivo circiter 1 mm. projecto; ovarium conicum, circiter 1.5 mm. longum et 2 mm. basi diametro, 4-loculatum, loculis 1-ovulatis, stylo 3 mm. longo, stigmatibus punctiformi. Fructus ignotus.

DISTRIBUTION: Brazil.

BRAZIL: State of Amazonas, Borba (Rio Madeira), among low growth in sandy field, *A. Ducke* 468 (AA, TYPE; FM, Mo, NY, US), April 22, 1937 (small shrub with pink flowers).

The leaves of *T. borbensis* are generally elliptic, subrotund at the base, with the margins serrate and very irregular. The pedicels are short (5–7 mm. long) and recurved and the bracteoles are minute, triangular and glandular-denticulate. In all the flowers examined, the ovary proved to be four-celled, each cell 1-ovulate and the stigma punctiform. In the stamens the connective is projected into a long (1 mm.) caudate appendage.

4. *Ternstroemia Gleasoniana*, sp. nov.

Frutex 3.0–4.5 m. altus, ramulis crassis teretibus griseis. Folia crassocoriacea, oblongo-elliptica vel oblongo-obovata, 18–21 cm. longa et 7–8 cm. lata, apice obtusa vel subrotundata, abrupte acuminata, basi obtuse cuneata, subtus non punctata, margine subintegerrima, pauce glanduloso-denticulata, subrevoluta, costa supra profunde canaliculata, subtus elevata, venis 18–20 paribus, supra obscuris, subtus conspicuis, petiolis crassis 2.0–2.5 cm. longis. Flores apice ramulorum congesti; pedicelli crassi, 6–8 mm. longi, bracteae glanduloso-denticulatis basi depositis; bracteolis 2 inaequalibus late ovatis vel suborbicularibus, 3 mm. longis et 2.7–4.0 mm. latis, margine glanduloso-

denticulatis; sepala 5, imbricata, crassa, exterioribus 5–7 mm. longis et 5–6 mm. latis, margine sparse glanduloso-denticulatis, interioribus ovatis 6–8 mm. longis et 5.0–5.5 mm. latis, margine integerrimis scariosis; petala 5, ovata, longo-acuminata, 5.0–5.5 mm. longa, basi ad 3 mm. connata; stamina ca. 25, uni-seriata, 3–4 mm. longa, filamentis crassis 1.0–1.5 mm. longis, antheris subsagittatis ca. 2 mm. longis, connectivo 0.25 mm. pro-jecto; ovarium subconicum ca. 1.5 mm. longum, 1-loculatum (ut videtur), pauci-ovulatum, stylo integerrimo, 4 mm. longo, stigmatе punctiformi. Fructus ignotus.

DISTRIBUTION: British Guiana.

BRITISH GUIANA: Potaro Landing, in clearing and along roadsides, *H. A. Gleason* 258 (TYPE G; NY), June–July 1921 (shrub 12–15 ft. high).

This species is delimited by the following outstanding characters: (1) shrub 3–4 m. high; (2) leaves unusually large (18–21 × 7–8 cm.), thick-coriaceous, under surface smooth (not punctate); (3) flowers congested at apex of branchlets; (4) pedicels short, 6–8 mm. long, with glandular-denticulate bracts at the base; (5) petals ovate, long-acuminate, joined for over two-thirds entire length; (6) style entire and stigma punctiform.

Great difficulty was experienced in making dissections of the ovary of this species. Because the flowering material was sparse only three dissections could be made. The ovary appeared one-celled, with no apparent septa separating the ovules into more than one compartment. The undivided punctiform stigma and the terete unmarked style would seem to bear out this conclusion. However, the ovaries were all rather flattened, making positive conclusions impossible.

Most closely allied to this species is *T. grandiosa*. These two species from a vegetative point of view appear identical. However, *T. grandiosa* can be separated by its habit (tree 12 m. high), the punctate-dotted under-surface of the leaves, the longer pedicels (1–2 cm. long), the long-ovate bracteoles (6–8 mm. long, 4 mm. wide), the profuse, deep glandular-denticulations along the margin with the indentations measuring nearly 0.5 mm., the larger petals and the two-parted style.

It is a pleasure to name this species in honor of Dr. H. A. Gleason, Curator of the herbarium of the New York Botanical Garden.

5. ***Ternstroemia discoidea*** Gleason in Bull. Torrey Bot. Club, **58**: 398. 1931.

*Ternstroemia monosperma* Gleason, op. cit. **58**: 399. 1931. Syn. nov.

DISTRIBUTION: Venezuela.

VENEZUELA: Mount Duida, slopes of Ridge 25, alt. 1700–1800 m., *G. H. H. Tate* 405 (TYPE, NY), Nov. 26, 1928 (bush 8 ft.; flowers white). — Mount Duida, Central Camp, alt. 1450 m., *G. H. H. Tate* 1019 (TYPE of *T. monosperma*, NY), Aug. 1928 – Apr. 1929.

Bush 3 m. with young branchlets verticillate, gray, angled, striate. Leaves coriaceous, elliptic-oblong or cuneate-oblong, 3.0–5.5 cm. long, 1.0–2.5 cm. wide, rounded and minutely retuse at apex, cuneate at base, the margin finely crenulate, the crenulations showing only near apex because of revolute sides, dark-punctate below, the midrib canaliculate above, raised below, the veins inconspicuous, the petiole 5–8 mm. long. Flowers solitary, crowded at base of the shoots of the season's growth; pedicel slender, recurved, up to 2.8 cm. long; bracteoles 2, minute, opposite or



alternate, one present immediately below the sepals and a second further down the pedicel, long-ovate, ca. 2 mm. long, glandular denticulate; sepals suborbicular 3–4 mm. long, 4–5 mm. wide, the outer lobes glandular-denticulate, the inner lobes with entire scarious margins; petals 5, broadly obovate, 5–6 mm. long, 3–4 mm. wide, joined at the base; stamens +100, uni-seriate?, ca. 3 mm. long, their slender filaments joined at base, ca. 1.5 mm. long, adnate to base of corolla, the anthers linear, ca. 1.5 mm. long, the connective projected into a short apicule, 0.3–0.5 mm. long; ovary conical, flat, apparently single-celled; the style 2 mm. long, the stigma peltate. Fruit conical-ovoid, ca. 1.3 cm. long, 1-celled, 1- or 2-seeded, the seeds ovoid, 7 mm. long; fruiting calyx accrescent, the sepals enlarged to nearly 9 mm. width.

The angled, striate branchlets, the small, thick, cuneate leaves, the rounded sepals, small in anthesis, later accrescent, the peltate stigma, the one-celled ovary and the one- or two-seeded fruit all distinguish this species.

Great difficulty was experienced in obtaining a satisfactory dissection of the ovary. Each dissection showed only a minute slit for the cell of the ovary, with a rather thick wall. The fruit was considered by Gleason as only single-seeded, hence the name *T. monosperma* for the fruiting specimen. However, dissections show that the fruit can be two- as well as one-seeded. The accrescent calyx along with the one-seeded fruit were the basis of the species *T. monosperma*. Further study shows insufficient evidence for separating these two species.

6. *Ternstroemia punctata* (Aublet) Swartz, Prodr. Veg. Ind. Occ. 81. 1788.—Willdenow, Sp. Pl. 2<sup>2</sup>: 1128. 1799.—Smith in Rees, Cyclop. 35: no. 4. 1817.—De Candolle in Mém. Soc. Phys. Hist. Nat. Genève, 1: 410 (Mém. Ternstr. 18). 1822; Prodr. 1: 523. 1824.—Sprengel, Syst. Veg. 2: 595. 1825.—Spach, Hist. Nat. Veg. 4: 62. 1835.—Schomburgk, Fauna Fl. Brit.-Guiana, 1092. 1848.—Choisy in Mém. Soc. Phys. Hist. Nat. Genève, 14: 105 (Mém. Ternstr. 17). 1855.—Wawra in Martius, Fl. Bras. 12<sup>1</sup>: 270. 1886.—Melchior in Nat. Pflanzenfam. ed. 2: 21: 142. 1925.

*Taonabo punctata* Aublet, Pl. Guian. 1: 571. 1775; 4: t. 228. 1775.—Szyszylowicz in Nat. Pflanzenfam. III. 6: 188. 1893.

*Ternstroemia revoluta* Splitgerber in Van Hoveen & De Vries, Tijdschr. 9: 99. 1842; in Bot. Zeitung, 1: 95. 1843.

*Ternstroemia punctata* (Aubl.) Swartz var. *revoluta* (Splitg.) Choisy in Mém. Soc. Phys. Hist. Nat. Genève, 14: 105 (Mém. Ternstr. 17). 1855.—Wawra in Martius, Fl. Bras. 12<sup>1</sup>: 271. 1886.—Pulle, Enum. Pl. Surinam, 304. 1906.

*Mokofua punctata* (Aubl.) O. Kuntze, Rev. Gen. Pl. 1: 63. 1891.

DISTRIBUTION: British Guiana, Dutch Guiana, Venezuela, Brazil.

BRITISH GUIANA: Roraima, R. Schomburgk 600 (FM), 937 (G), 1842.—Upper Rupununi River, near Dadanawa, J. S. De La Cruz 1780 (FM, G, Mo, NY, US), July 1922 (8 ft. high).—Upper Mazaruni River, J. S. De La Cruz 2112 (FM, G, Mo, NY, US), 2216 (FM, G, NY, US), Sept.–Oct. 1922 (9–10 ft. high).—Malali, Demerara River, J. S. De La Cruz 2660 (G, Mo, NY, US), Oct.–Nov. 1922.—Kamakusa, Upper Mazaruni River, J. S. De La Cruz 2871 (G, NY, US), Nov. 1922. DUTCH GUIANA: Forest of Zandery, J. A. Samuels 471 (G, NY), May 31, 1936. VENEZUELA: Mount Auyan-Tepui, alt. 1100 m., G. H. H. Tate s.n. (NY) Dec. 1937 – Jan. 1938. BRAZIL: Upper Rio Negro River region, Weiss & Schmidt s.n. (NY), 1917–1918.

Small tree (3–8 m.) with twisted brittle, gray branchlets, not verticillate. Leaves heavy-coriaceous, obovate, 4–6 (–8) cm. long, 2–3 (–4) cm. wide, obtuse or rounded at the apex, emarginate, cuneate at the base, the

midrib canaliculate above, impressed the whole length of the leaf, raised below, the veins (8–11 pairs) raised on the upper surface obscure below, the margin entire, revolute, edged with glands, the under surface copiously dark-punctate, the petiole 3–5 mm. long. Flowers solitary axillary. Pedicels 2–3 cm. long, generally compressed with a row of glands along the angles (seen only under the microscope). Bracteoles 2, quickly caducous, ovate, ca. 6 mm. long, 3.0–3.5 mm. wide, concave, pergamentaceous, keeled, clearly glandular-denticulate along the margin, emarginate, apiculate at the apex, tapering at the base, leaving a small triangular scar when dropping. Calyx-lobes 5, ovate, subequal, 11–12 mm. long, coriaceous (1.5–2.5 mm. thick at base), abruptly long-acuminate, acumen 2 mm. long, distinctly glandular-denticulate on outer lobes, occasionally on inner lobes. Petals 5, ovate, ca. 6 mm. long, 3 mm. wide, membranaceous, long-acuminate, simulating calyx in shape. Stamens ca. 50, bi-seriate, filaments of unequal sizes 0.5–1.0 mm. long, joined at the base; anthers unequal, 1–2 mm. long in same flower, joined. Ovary conical, ca. 2 mm. diam., 3-celled, each cell ca. 3–4-ovulate, tapering at apex into style. Style 3-parted, 5 mm. long, free for 2 mm., parts of unequal length. Stigmas 3, punctiform. Fruit conical, rugose in drying, 3-celled.

The outstanding characters of this species are the entire punctate leaves with veins clearly evident on the upper surface, the long-acuminate petals and calyx-lobes, the latter unusually thick and starlike when expanded, the caducous bracteoles, leaving triangular scars, and the three-parted style and 3-celled ovary and fruit.

Choisy enumerated a var. *revoluta* based on *T. revoluta*. The characters of revolute margin and leaves crowded at apex are insufficient for even varietal delimitation. All species have a tendency toward revolute margins depending a great deal on the thickness of the leaf and the pressing and drying, and the crowding of leaves at the tip of the branchlets is a generic character.

7. ***Ternstroemia delicatula*** Choisy in Mém. Soc. Phys. Hist. Nat. Genève, **14**: 106 (Mém. Ternstr. 18). 1855. — Wawra in Martius, Fl. Bras. **12**<sup>1</sup>: 273. 1886 (excl. spec. Weddell). — Krug & Urban in Bot. Jahrb. **21**: 536. 1896. — Melchior in Nat. Pflanzenfam. ed. 2, **21**: 142. 1925. — R. O. Williams, Fl. Trinidad & Tobago, **1**: 70. 1929.

*Mokofua delicatula* (Choisy) O. Kuntze, Rev. Gen. Pl. **1**: 63. 1891.

*Taonabo delicatula* (Choisy) Szyszylowicz in Nat. Pflanzenfam. III. **6**: 118. 1893.

DISTRIBUTION: French Guiana, Trinidad.

FRENCH GUIANA: Cayenne, *Martin s.n.* (ISOTYPE, FM; photos, FM, G). TRINIDAD: Forests near Arima, alt. 600 m., *H. F. A. Eggers 1381* (NY, US).

This species is described as having membranaceous, obovate-elliptic leaves, narrowed at the base into a long petiole (6–15 mm.), obtuse or very shortly acuminate at the apex, 5–9 cm. long and 2–4 cm. wide, quite distinctly crenulate in the upper half, lateral nerves prominulous on both surfaces. The flowers are fairly numerous, crowded on the branchlets. The peduncle is slender, 1–2 cm. long, recurved. The 5 sepals are more or less equal, 5–6 mm. long, obtuse at the apex with eglandular entire margins. The ovary is globose-conical, 3-celled, contracted into a style ca. 4 mm. long which is topped by a subcapitate tri-crenate stigma. Each cell of the fruit is single-seeded.

The membranaceous leaves, the long petiole, the crowded flowers, the thin, recurved peduncle, the eglandular sepals and the tri-crenate subcapitate stigma are the distinguishing characters for identification.

8. **Ternstroemia Browniana**, sp. nov.

Arbor 6 metralis, ramulis subverticillatis teretibus striatis griseis. Folia coriacea, obovata, 4-6 cm. longa et 1.5-2.5 cm. lata, apice roundata vel obtusa, basi in petiolum attenuata, margine crenulata, subrevoluta, costa supra canaliculata, subtus elevata, venis non visibilibus, petiolis 3-5 (-7) mm. longis. Flores [*Sandwich* 393] axillares, solitarii, pedicellis 2.0-2.5 cm. longis gracilibus; bracteolis 2, oppositis inaequalibus deltoideis vel ovatis ca. 3 mm. longis, 2.0 et 2.5 mm. latis, revolutis, margine glanduloso-denticulatis; sepala 5, imbricata, subaequalia, erecta vel recurva, ca. 5 mm. longa et 4 mm. lata, margine integerrima, scariosa; petala 5, subaequalia, 5-6 mm. longa et 2 mm. lata, basi 4 mm. connata, lobis obtusis orbicularibusque; stamina ca. 30, uni- vel bi-seriata, 4.0-4.5 mm. longa, filamentis crassis 0.5-0.8 mm. longis, basi connatis et ad corollam adnatis, antheris linearibus 2.0-2.5 mm. longis, connectivo 1 mm. vel minus projecto; ovarium conicum, ca. 2 mm. longum, 3-loculatum, loculis 1-ovulatis, stylo 25 mm. longo, stigmatibus punctiformi. Fructus [*Hitchcock* 17306] globosus, ca. 1 cm. longus, 8-9 mm. diam., 3-loculatus, loculis 1-seminatis, stylo crasso 6 mm. longo, stigmatibus punctiformi; seminibus ca. 6 mm. longis. Fructus sepala 5-8 mm. longa et 4-5 mm. lata.

DISTRIBUTION: British Guiana.

BRITISH GUIANA: Rockstone, sandy scrub, *A. S. Hitchcock* 17306 (TYPE), NY; G, US), Dec. 31, 1919 - Jan. 1, 1920 (tree 20 ft. high). — Essequibo River, Moraballi Creek, near Bartica, in wallaba forest on sandy ridge, alt. near sea-level, *N. Y. Sandwith* 393 (NY, US), Oct. 7, 1929 (tall tree 78 ft. high, 8 in. diam.; sepals pinkish purple within; petals united, white, yellow at top; flowers very beautiful, fragrant like a sweet soap). — Northwest District, Barima River, lat. 8° 20' N., long. 59° 50' W., *J. S. De La Cruz* 3387 (FM, G, NY), Mar. 19-22, 1923 (10 ft. tall). — Malali, Demerara River, lat. 5° 35' N., *J. S. De La Cruz* 2666 (FM, G, NY), Oct. 30 - Nov. 5, 1922.

For some time the type of this species (*Hitchcock* 17306) has been known to be specifically different from *T. delicatula*, its nearest relative. Various workers have commented through annotations on the likenesses and differences, but no one described it as new. The name *T. Browniana* is selected in memory of the late Dr. N. E. Brown, formerly of Kew, who studied this specimen as well as many other collections from British Guiana.

Since *Hitchcock* 17306 is strictly a fruiting specimen, the above description of the flowering parts was drawn from *Sandwith* 393.

The resemblance to *T. delicatula* is found in the entire, scarious-margined, small (5 mm. long) calyx-lobes, the 3-celled ovary and fruit with a single ovule and seed to each locule, and the slender pedicel. The differences from *T. delicatula* lie in the punctiform rather than subcapitate, tri-crenate stigmas, the coriaceous veinless leaves, shorter and rounded at the apex and the shorter petiolate rather than the membranaceous, oblong-elliptic, delicately veined leaves, more acuminate at the apex and with petioles 10-15 mm. in length.

9. ***Ternstroemia alnifolia*** Wawra in Martius, Fl. Bras. 12<sup>1</sup>: 275. 1886. — Melchior in Nat. Pflanzenfam. ed. 2, 21: 142. 1925.



*Ternstroemia alnifolia* Wawra var. *lancifolia* Wawra, l. c.

*Mokofua alnifolia* (Wawra) O. Kuntze, Rev. Gen. Pl. **1**: 63. 1891.

*Taonabo alnifolia* (Wawra) Szyszylowicz in Nat. Pflanzenfam. III. **6**: 189. 1893.

DISTRIBUTION: Brazil.

No specimens examined.

Leaves obovate, 10–12 cm. long, 4–5 cm. wide, rounded or emarginate at apex, attenuate at base, the midrib impressed above, prominent below, ferrugineous and nigro-punctate below, veins ca. 7, the margin serrate-repandulate, the petiole ca. 1 cm. long. Flowers solitary, the peduncles 1.5–2.0 cm. long, usually erect; bracteoles minute, coriaceous, oblong, subacute, conspicuously glandular-denticulate; calyx-lobes coriaceous, ca. 1 cm. long, the outer lobes oval, glandular, the inner lobes orbicular, entire; petals three-fourths as long as sepals, connate at base, concave, connivent before anthesis, narrowed at base; stamens bi-seriate, three-fourths as long as petals, the filaments flat, wider than the anthers, very short, the anthers linear-oblong, nearly five times longer than the filaments, truncate at apex with a short mucron; ovary ovoid, somewhat 3-sided, sulcate due to the impression of stamens, 3-celled (or 5–6-celled), 2 ovules in each cell or if 6-celled, 1-ovulate, the style short, hardly equalling the ovary in length, thick, 3–5-angled, the stigma orbicular, tri-crenate, lobes often bi-sulcate. Fruit globose, ca. 1.5 cm. long, the seeds oblong-obovate, 8 mm. long.

Although no material has been available for the study of this species and even though it is closely allied to and invades the range of *T. brasiliensis*, there can be no doubt of its status. The outstanding characters are (1) the very short tri-partite style and peltate stigmas; (2) the 3-celled (or 5–6-celled) ovoid ovary; (3) the truncate stamens; (4) the glandular bracteoles and outer calyx-lobes and (5) the leaves nigro-punctate below.

Listed in the Index Kewensis is *Taonabo ulmifolia* Szyszylowicz but not *Taonabo alnifolia* Szyszylowicz. Since Szyszylowicz did not include the former in his work, one may assume that *T. ulmifolia* is merely a typographical error for *T. alnifolia*.

10. ***Ternstroemia brevistyla*, sp. nov.**

Ramuli grisei, teretes. Folia coriacea, obovata vel elliptica, 3.0–5.5 cm. longa et 2.0–3.2 cm. lata, apice rotundata, rare retusa, basi late cuneata, margine plana ad apicem crenulata, costa supra leviter impressa, subtus leviter elevata, undique ad apicem evanida, nervis non visibilibus, petiolis 4–8 mm. longis. Flores non visi. Fructus solitarii, axillares, subglobosi, ca. 7 mm. longi et 5–6 mm. lati, 3-loculati (rare 4-loculati) loculis 1-seminatis; pedicellis 6–8 mm. longis; bracteolis 2, inaequalibus, oppositis, suborbicularibus vel late ovatis,  $2.5 \times 2$  mm. vel  $3 \times 3$  mm., margine glanduloso-denticulatis; sepalis 5, imbricata, suborbicularia, 4–6 mm. longa et ca. 5 mm. lata, exterioribus sparse glanduloso-denticulatis, interioribus margine scariosis; stylo breve 1 mm. vel minus longo, sulcato, stigmatibus subcapitato, 3-crenato.

DISTRIBUTION: Venezuela.

VENEZUELA: Mount Auyan-Tepui, alt. 1100 m., *G. H. H. Tate 1149* (TYPE, NY; US), Dec. 1937 – Jan. 1938.

This species is most closely related to *T. discoidea*. However, from this latter species it can be separated by the very brief style, the 3-celled fruit

and the tri-crenate, subcapitate stigma. The only feature of resemblance is the leaf.

Ordinarily the fruit of *T. brevistyla* is 3-celled and the stigma tri-crenate. Occasionally, the fruit is 4-celled and when such is the case, the stigma is 4-crenate. The very brief style is probably the shortest among the American species.

11. *Ternstroemia penduliflora*, sp. nov.

Arbor 9 m. metralis (fide coll.), ramis teretibus griseis, ramulis teretibus griseo-brunneis. Folia membranacea (juvenilia), elliptica vel obovata, 12–16 cm. longa, 2.5–4.5 cm. lata, undique opaca, apice acuminata, basi longa attenuata, margine plana et subcrenulata, costa supra canaliculata apice evanida, subtus conspicua, venis 20–30 paribus ramosis haud conspicuis, petiolis circa 1.5 cm. longis. Flores solitarii, proxime positi, pedicellis gracilibus pendulis circa 4 cm. longis rubro-brunneis; bracteolis 2 oppositis inaequalibus ovatis 5–8 mm. longis et 2.5–3.0 mm. latis, distincte longeque acuminatis, margine integerrimis; sepala 5, late obovata, 7–10 mm. longa et 2.5–3.0 mm. lata, apice rotundata vel subtruncata, rostrata margine exterioribus sparse glanduloso-denticulatis, interioribus scariosis; petala 5, oblongo-obovata, circa 8 mm. longa, 3–4 mm. lata, 4 mm. connata, apice truncata vel rotundata, margine crenulata; stamina circa 40, uniseriata, 5–6 mm. longa, apiculata, filamentis 1 mm. minusve longis, basi connatis, ad corollam adnatis, antheris linearibus circa 3 mm. longis, apiculis 1 mm. plusve longis; ovarium conicum, sulcatum, circa 3 mm. longum 3-loculatum, loculis 2 plusve ovulatis, stylo ca. 3 mm. longo, stigmate punctiformi. Fructus non visus.

DISTRIBUTION: Peru.

PERU: Dept. Loreto, Mishuyacu, forests near Iquitos, alt. 100 m., *G. Klug* 1487 (TYPE, NY), May–June 1930 (tree 9 m. high; flowers white and rose).

The outstanding characters of this species are: (1) the long, membranaceous, acuminate many-nerved leaves; (2) the long (4 cm.) pendulous graceful pedicels, closely arranged on the axis; (3) the long (up to 8 mm.) ovate, distinctly acuminate bracteoles; (4) the truncate petals (8 mm. long), joined one-half their length; (5) the stamens (5–6 mm. long) with apicules usually longer than the filaments; (6) the 3-celled ovary and the punctiform stigma.

Closely allied to this species and known from the same type locality is *T. Klugiana*. Features of *T. penduliflora* separating it from the latter are the long pendulous pedicels, the larger membranaceous leaves, the longer, acuminate bracteoles and larger sepals and the 3-celled ovary.

The leaves on the type specimen are truly membranaceous, but they are apparently very young. It is highly probable that on maturity these leaves will become coriaceous.

12. *Ternstroemia Candolleana* Wawra in Martius, Fl. Bras. **12**<sup>1</sup>: 373. 1886. — Melchior in Nat. Pflanzenfam. ed. 2, **21**: 142. 1925. — Gleason in Bull. Torrey Bot. Club, **58**: 395. 1931.

*Taonabo Candolleana* (Wawra) Szyszylowicz in Nat. Pflanzenfam. III, **6**: 188. 1893.

*Ternstroemia Candolleana* Wawra var. *rotundata* Wawra in Martius, Fl. Bras. **12**<sup>1</sup>: 274. 1886.

DISTRIBUTION: Brazil.

BRAZIL: State Amazonas, Rio Negro, near Barra, *R. Spruce 1544* (ISOTYPE, G, NY; photo FM), July 1851. — Same locality, *L. Riedel 1593* (ISOTYPE G; fragment FM). — Muyrapenima, river banks and flood sands on the Rio Negro, *G. H. H. Tate 61* (NY, US). — Along Guiania river above the mouth of the Casiquiari river, *R. Spruce 3496* (ISOTYPE of var. *rotundata*, G, NY; fragment & photo FM).

Leaves chartaceous to subcoriaceous, oblong-obovate, 7-10 cm. long, 1.5-3.0 cm. wide, acuminate to obtuse at the apex tapering gradually at base into petiole, shining above, ferrugineous below, 7-8 pairs of veins hardly perceptible, the margin plane to subrevolute, entire to subcrenulate, the petiole 1 cm. long. Flowers solitary, the pedicels 2-4 cm. long, filiform; bracteoles 2, opposite unequal, 5-8 mm. long, ovate-lanceolate, acute, the second bracteole shorter ovate; calyx-lobes 5, imbricate, ca. 1 cm. long in flower, 0.7 cm. wide, obtuse at apex, as much as 1.3 cm. long and 1 cm. wide in fruit, the margin scarious, not glandular-denticulate; corolla 9 mm. long, fused at base into a tube 4 mm. long, the petals 5, ovate, subacute; stamens 50, bi- or tri-seriate, caudate, the filaments 1 mm. long, connate at base and adnate to corolla, the anthers 4 mm. long, linear; the cauda 2 mm.+ long; ovary subconical, 2 mm. diam., 3-celled, each cell 2-ovulate; style long for the genus (7-11 mm.); stigma punctiform. Fruit ovate or subconical, sulcate, 1.0-1.5 cm. long, 3-celled, usually 6-seeded; seeds 6-8 mm. long.

The outstanding characters of this species are: (1) the corolla fused for one-half its entire length into a tube; (2) the large calyx-lobes (up to 1.5 cm. in fruit); (3) the elongated style (up to 11 mm.); (4) the long-caudate stamens, the cauda 2 mm. or more long.

12A. *Ternstroemia Candolleana* Wawra var. *angustifolia* Wawra in Martius, Fl. Bras. 12<sup>1</sup>: 274. 1886. — Gleason in Bull. Torrey Bot. Club, 58: 395. 1931.

DISTRIBUTION: Brazil.

BRAZIL: Camanáos, flooded grounds on the Rio Negro, *G. H. H. Tate 125* (NY, US).

In floral characters, this variety matches the species most accurately and because of the elongated style, large calyx-lobes and the filiform pedicel must be retained in close association. The leaves, however, are most distinctive for the genus. They are submembranaceous, long-linear, 8-13 cm. long and seldom exceed 1.5 cm. in width, taper gradually at both ends and along the margin are plane and slightly crenulate toward the apex.

### 13. *Ternstroemia subcaudata*, sp. nov.

Arbor vel frutex 3-9 metralis, ramulis rugosis teretibus griseis. Folia coriacea vel subcoriacea, oblongo-ovata, 6.5-8.5 cm. longa et 1.5-2.7 cm. lata, apice longo-acuminata vel subcaudata, basi in petiolum attenuata, margine integerrima et plana, costa supra impressa, subtus elevata, venis obscuris, petiolis 1.0-1.5 cm. longis. Flores solitarii, pedicellis gracilibus 1.0-1.5 cm. longis, bracteolis 2 suboppositis inaequalibus ovatis 0.7-1.4 mm. longis et circiter 1 mm. latis acuminatis, margine glanduloso-denticulatis; sepala 5, imbricata, inaequalia, 3.0-4.5 mm. longa, 2.5-4.0 mm. lata, exterioribus lato-ovatis brevioribus crassioribusque, margine scarioso-fimbriatis (non glanduloso-denticulatis), interioribus suborbicularibus, margine scariosis; petala 5, ovata, basi ad medium connata, 4-5 mm. longa, margine scariosa; stamina circiter 35, uni-seriata, inaequalia, 3-4 mm. longa, filamentis crassis 1 mm. vel minus longis, basi connatis et ad



corollam adnatis, antheris circiter 1.5 mm. longis oblongis, connectivo longo-caudato 1 mm. vel plus projecto; ovarium conicum vel subglobosum, circiter 1.5 mm. longum, 3-loculatum, loculis 1-ovulatis, stylo crasso circiter 2.5 mm. longo, stigmatibus punctiformi. Fructus ignotus.

DISTRIBUTION: Brazil.

BRAZIL: State Amazonas, Rio Negro, near Manáos, *E. Ule* 8921 (TYPE, US), August 1910 (tree or shrub 3–9 m.; flowers reddish yellow).

The subcaudate coriaceous leaves with obscure veining, the long-caudate connective in the stamens and the punctiform stigma are characters of importance in distinguishing this species and separating it from its nearest relative, *T. delicatula*. These two species are allied by the three-celled ovary with a single ovule in each cell.

14. *Ternstroemia Schomburgkiana* Benth in Hooker, London Jour. Bot. **2**: 362. 1843. — Klotzsch in Schomburgk, Fauna Fl. Brit.-Guiana, 1092. 1848. — Choisy in Mém. Soc. Phys. Hist. Nat. Genève, **1**: 105 (Mém. Ternstr. 17). 1855. — Wawra in Martius, Fl. Bras. **12**<sup>1</sup>: 272. 1886. — Melchior in Nat. Pflanzenfam. ed. 2, **21**: 142. 1925.

*Mokofua Schomburgkiana* (Benth) O. Kuntze, Rev. Gen. Pl. **1**: 63. 1891.

*Taonabo Schomburgkiana* (Benth) Szyszylowicz in Nat. Pflanzenfam. III. **6**: 188. 1893.

DISTRIBUTION: British Guiana.

BRITISH GUIANA: Dry savannahs near Roraima Mt., *R. Schomburgk* 967 (photo, FM, G).

Branchlets grayish, terete, comparatively smooth, sometimes verticillate. Leaves coriaceous, obovate, up to 7 cm. long and 3 cm. wide, obtuse or rounded at apex, obtusely cuneate at base, entire or inconspicuously serrulate, ca. 8 pairs of veins evident only on the upper surface, punctate below, the petiole 6–7 mm. long. Flowers 4–5-aggregate at the tips of the branchlets; pedicels 7–8 mm. long; bracteoles ovate, ca. 1.5–2.0 mm. long, apiculate, glandular-denticulate; calyx-lobes ovate, acute, 5–6 mm. long, glandular-denticulate; petals acute, equalling the calyx-lobes in length; stamens uni-seriate, ca. 20, shorter than the petals, the filaments very sort, thick; ovary (fide Wawra) 3-celled, the cells 3–4-ovulate, the style longer than the ovary.

The foregoing description is based upon those of Benth (1843) and Wawra (1886) along with a photograph of *Schomburgk* 967 in the Berlin herbarium. There are discrepancies between Benth's original description and Wawra's interpretation. Not only do Wawra's measurements vary considerably from those of Benth, but he also misinterprets those of Benth. Wawra states that Benth recorded the pedicel length as 2 cm. Actually, Benth states that the pedicels are 4 lines long, which when metrically interpreted would be 8 mm. Wawra states that the bracteoles are 5 mm. long, the calyx-lobes 1 cm. long and that the latter are rounded (key). Examination of the photograph shows the bracteoles to be only 1–2 mm. long, at the most, and the calyx-lobes acute and 5–6 mm. long.

Cited here questionably might be *Pinkus* 281 (FM, Mo, NY, US), collected in British Guiana, Feb. 3, 1939 on the Arubaru River (Kako tributary), upper Mazaruni drainage, near Haiamatipu Mt., alt. 600 m. (shrub

on marshy savannah; petals white, pink tinged; fruit yellow). This specimen agrees with the original description and the photograph of the type in all details, except that it possesses a 2-celled rather than a 3-celled ovary.

15. **Ternstroemia brasiliensis** Cambessèdes in A. St. Hilaire, Fl. Bras. Mer. **1**: 298, t. 59. 1827. — Spach, Hist. Nat. Veg. **4**: 61. 1835. — Walpers, Repert. Bot. Sept. **1**: 369. 1842. — Choisy in Mém. Soc. Phys. Hist. Nat. Genève, **14**: 105 (Mém. Ternstr. 17). 1855. — Wawra in Martius, Fl. Bras. **12**<sup>1</sup>: 271. 1886; in Warming, Symb. Fl. Bras. Centr., Pt. 32. 880. 1889. — Usteri, Fl. Sao Paulo, 205. 1911. — Melchior in Nat. Pflanzenfam. ed. 2, **21**: 142. 1925.

*Ternstroemia brasiliensis* var. *minor* Cambessèdes in A. St. Hilaire, Fl. Bras. Mer. **1**: 298. 1827.

*Ternstroemia brasiliensis* var. *parvifolia* Wawra in Martius, Fl. Bras. **12**<sup>1</sup>: 272. 1886.

*Mokofua brasiliensis* (Cambessèdes) O. Kuntze, Rev. Gen. Pl. **1**: 63. 1891.

*Taonabo brasiliensis* (Cambessèdes) Szyzylowicz in Nat. Pflanzenfam. III. **6**: 188. 1893.

DISTRIBUTION: Brazil.

BRAZIL: Rio de Janeiro: *L. Riedel* 79 (G, NY); 1412 (US). — *Wilkes* U. S. Expl. Exped. s.n. (US). — *A. Glaziou* 8278 (AA, NY), 13566 (AA, FM, NY), Feb. 29, 1932 (tree). — Capirari, fields, *A. St. Hilaire* s.n. (type of var. *minor*, photo and fragment, FM). Minas Geraes: *I. F. Widgren* 137 (US), Dec. 11, 1845. — *A. F. Regnell* s.n. (US). — Ouro Preto, Campo Grande, Serra de Ouro Preto, Campoeira em pedras, *M. Barreto & J. Badini* 9142 (FM), Aug. 15, 1937 (tree 3 m.). — Serra da Piedade, Caeté, campo, *M. Barreto* 5442 (FM), May 6, 1934 (tree 2 m.). — Barbacena, fields, *A. St. Hilaire* s.n. (TYPE, photo FM) (fl. December). — Lagoa Santa, *E. Warming* s.n. (FM, US). — Jacarehy, in forest, *P. Dusen* 16114 (Mo) or 16144 (G). — Precise locality lacking, *F. Sello* 52 (G).

Small trees or shrubs. Leaves coriaceous, oblong-obovate to lanceolate, 6–13 cm. long, 2.0–4.5 cm. wide, obtuse at apex, tapering at base into petiole, opaque, green above, yellowish green below, granular punctate, upper half subentire or serrulate, revolute, 7–9 pairs of veins somewhat conspicuous above, the petiole 1.0–1.5 cm. long. Flowers axillary, usually solitary, the peduncles seldom over 2.5 cm. long; bracteoles 2, opposite, 2–4 mm. long, ovate or rounded, glandular-denticulate, keeled; calyx-lobes 5, imbricate, suborbicular to broadly ovate, concave, pergamentaceous, unequal, the outer lobes smaller, 6–7 mm. long, 5–7 mm. wide, glandular-denticulate, the inner lobes 8–9 mm. long, 7–8 mm. wide, the margin scarious; petals 5, ovate, 8 mm. long, 3–5 mm. wide, joined for 3 mm.; stamens ca. 45, bi-seriate, the filaments ca. 1.5 mm. long, compressed, adnate, the anthers linear, ca. 5 mm. long, apiculate; ovary globose, ca. 4 mm. diam., usually 3-celled, occasionally incompletely 5–6-celled, the locules usually 2-ovulate, the style sturdy, ca. 5 mm. long, somewhat compressed, the stigma punctiform with 3 distinct circular stigmatic surfaces (visible only under binoculars). Fruit globose to ovoid, up to 1.5 cm. long, primarily 3-celled, may appear 4–5–6-celled, few seeded, often one to each locule.

Closely allied, if not identical, is *T. venosa* Sprengel. Clearly described by Sprengel, *T. venosa* has been ignored by all botanists or classified as dubious or "little known." It cannot be considered a dubious species since it was the first species of this genus described from eastern Brazil. It may be that the type collected by *C. F. Otto* has been lost or destroyed. However, Sprengel later cited a second specimen collected by *F. Sello*. At any rate, it seems that no botanist dealing with the genus has made much

of an effort to see the type of this species. A few features of *T. venosa* may, at first, seem alien to *T. brasiliensis*. The leaf is described as lanceolate. *Widgren 137* has typically lanceolate leaves. Sprengel describes the fruit as two-celled, eight-seeded. *Barreto 5442* has fruit which, when sectioned near the apex, is two-celled, and when sectioned near the base appears four-celled. Incidentally, although Cambessedes describes the fruit as three-five-celled, his illustration shows a four-celled capsule. The fruit of *Barreto & Badini 9142*, when sectioned near the apex, appears two-celled, lower down it appears three-celled in section and near the base incompletely six-celled. *Riedel 327* in fruit is three-celled, six-seeded. On the same specimen are fruits that are five-celled (probably incompletely so), also six-seeded. These variations are not unusual in the genus.

Sprengel in describing *T. venosa* states "pedunculi axillares, aggregati, brevissimi" and "Corolla quinquepartita, calyce duplo longior." In *T. brasiliensis*, the peduncles are solitary and ca. 2.5 cm. long and the corolla is only slightly longer than the calyx. Wawra (1886) also refers to the pedicels as aggregate. In the material examined by me, the pedicels are always solitary. If Sprengel were comparing the corolla lobes with the outer calyx-lobes, his statement concerning the corolla length might be applied to *T. brasiliensis*.

If these two species prove to be identical, as seem likely, the name *T. venosa* Sprengel (1821) must be retained in place of *T. brasiliensis* Cambessedes which was described in 1827, six years later.

16. ***Ternstroemia globiflora*** Ruiz & Pavon, Syst. Veg. Fl. Peruv. Chil. 179. 1798. — De Candolle in Mém. Soc. Phys. Hist. Nat. Genève, **1**: 412 (Mém. Ternstr. 20). 1822; Prodr. **1**: 524. 1824. — Choisy in Mém. Soc. Phys. Hist. Nat. Genève, **14**: 104 (Mém. Ternstr. 16) 1855.

*Ternstroemia globuliflora* Steudel, Nom. Pl. ed. 2, **2**: 669. 1841. Sphalm.

*Ternstroemia globosa* Choisy in Mém. Soc. Phys. Hist. Nat. Genève, **14**: 104 (Mém. Ternstr. 16). 1855.

*Ternstroemia minoriflora* Hochreutiner in Ann. Conserv. & Jard. Bot. Genève, **20**: 192. 1917. — Melchior in Nat. Pflanzenfam. ed. 2, **21**: 142. 1925.

DISTRIBUTION: Peru.

PERU: In Andium silvaticis frigidis versus Pillao vicum, *J. Pavon s.n.* (TYPE, Madrid; fragment & photo, FM). — Without locality, *J. Pavon s.n.* (photo of specimen labeled *T. globosa*, Geneva; FM). — Without locality, *J. Pavon s.n.* (type of *T. minoriflora* Geneva; fragment & photo, FM). — Dept. Ayacucho, Aina, between Huanta and Río Apurimac, open woods, alt. 750–1000 m., *E. P. Killip & A. C. Smith 22552* (US), May 1929 (tree 30–40 ft. with white fleshy petals). — Dept. Libertad, Prov. Patá, valley of the Mishiollo River below Ongóu, alt. 1300 m., *A. Weberbauer 7064* (G, US), Aug. 1914 (shrub 5 m. high with pale yellow flowers).

Small tree or shrub. Leaves broadly lanceolate, elliptic or obovate, often asymmetrical, subcoriaceous, acuminate or subacuminate at apex, cuneate at base, 6–8 pairs of veins visible on lower surface, the margin plane, entire, the petiole 5–7 mm. long. Flowers rather small, axillary, solitary; pedicels 0.7–1.8 cm. long, compressed; bracteoles 2, opposite rounded or triangular 1–2 mm. long, not glandular-denticulate; calyx-lobes 5, suborbiculate, the outer two smaller, 2.5–3.0 mm. long, the inner three 4–5 mm. long, scarious margined not glandular-denticulate; corolla white or pale yellow, gamopetalous, calyptrate, globose, ca. 3 mm. long,



nearly cleistogamous, the wall 1 mm. thick, 5 minute lobes at apex, imbricate, suborbicular, less than 1 mm. long; stamens 10–16, adnate to base of corolla, uni-seriate, not over 2 mm. long (over all), the filaments various lengths, 0.5–2.0 mm. long, fused sometimes their entire length swelling at center, decreasing near apex, with two anthers appearing at apex, the anthers minute usually ovate, ca. 0.5 mm. long, two-celled, basifixed; ovary conical, sulcate, ca. 1 mm. long, 1.5 mm. diam. at base, two-celled, 1–2-ovulate, ovules attached at apex, the ovary tapering through style (1 mm. long) into a punctiform stigma. Fruit ovate, ca. 1 cm. long and 1 cm. diam., the seeds 2–3, buff colored, covered with reddish-brown mealy coating, ca. 9 mm. long and 5 mm. diam.

At my disposal were fragments and photographs of the types of both *T. globiflora* and *T. minoriflora*. Of the former, one flower bud was available. There is no doubt that the two are synonymous. Fortunately, the two other specimens cited above (*Weberbauer 7064* and *Killip & Smith 22552*) furnished flowers and fruit for dissection. I was most anxious to dissect the flower after reading Hochreutiner's excellent treatment under *T. minoriflora*. The globose, calyptrate, nearly cleistogamous corolla is a most unusual character in the genus. Ruiz & Pavon undoubtedly recognized this character when they utilized the name *T. globiflora*, but their description was so simple and incomplete that botanists were unable to associate unnamed material with the species. However, after Hochreutiner's enlightening treatment, one can see in Ruiz & Pavon's description, "corollis globosis quinquedentatis" that the two authors really understood the significance of their species as against *T. quinquepartitis* "corollis quinquepartitis," the latter expression causing considerable controversy. Both species were either dropped or ignored by most authors until now.

In the eyes of some workers this species might constitute the basis for a new genus. However, many species in the Theaceae in early flower present the same globose appearance of the corolla. Often, it is impossible to separate the corolla-lobes, so tightly do they overlap in the bud. In this species, the lobes are thicker and a nearly complete coalescence has actually taken place.

17. *Ternstroemia congestiflora* Triana & Planchon in Ann. Sci. Nat. sér. 4, **18**: 259. 1862. — Melchior in Nat. Pflanzenfam. ed. 2, **21**: 142. 1925.

*Mokofua congestiflora* (Triana & Planchon) O. Kuntze, Rev. Gen. Pl. **1**: 63. 1891.

*Taonabo congestiflora* (Triana & Planchon) Szyszylowicz in Nat. Pflanzenfam. III. **6**: 189. 1893.

DISTRIBUTION: Colombia.

COLOMBIA: Dept. Boyaca, vicinity of Tunja, *Purdie s.n.* (ISOTYPE, G). — Precise locality unknown, *J. C. Mutis 1116* (US).

Branchlets terete, thick subverticillate. Leaves heavy-coriaceous, oblong-ovate to oblong-elliptic, 5–8 cm. long, 2–3 cm. wide, obtuse, emarginate at apex, cuneate at base, 7–8 pairs of branching veins distinct on lower surface, the margin entire or subcrenulate near apex, revolute or subrevolute, the petiole 4–7 mm. long. Flowers axillary, solitary, the pedicel 4–5 mm. long in type (2 cm. in *Mutis 1116*), sturdy, 2 mm. diam.; bracteoles 2, opposite, ca. 3 mm. long, 4 mm. wide, obtuse, rounded at apex,

scarious margined, not glandular-denticulate, keeled on dorsal surface; calyx-lobes imbricate wider than long, 5-6 mm. long, 6-7 mm. wide, orbicular, scarious-margined, not glandular-denticulate, concave, pergammentaceous; corolla lobes ca. 8 mm. long, 6 mm. wide, obtuse at apex; joined at base by thick band 1 mm. or more wide; stamens ca. 60, 4.0-4.5 mm. long, the filaments 2-3 mm. long, the anthers oblong, 1.5-2.0 mm. long; ovary subconical, ca. 4 mm. diam. near base, 2-celled, few-ovulate; style short, stocky, 2.5-3.0 mm. long, 1 mm. diam.; stigma decidedly bi-crenate, involute. Fruit not seen.

Outstanding characteristics of this species are the thick, sturdy branchlets, the heavy-coriaceous leaves, the branching veins clearly distinct on the lower surface, the globose corolla and, in the type, the very short pedicels.

The corollas appear globose, similar to those of *T. globiflora* R. & P. from Peru. The calyx-lobes are extremely concave and fail to turn back at maturity. Of all the flowers examined, none were found in which the corolla had actually opened. Even though the calyx-lobes were spread the corolla appeared as a small globe, not with minute lobes at the apex as in *T. globiflora* but with the petals compactly compressed. The outline of the outer petal can be discerned, but unlike most species, one cannot tease the petals open. Frankly, I doubt if the petals ever open. The whole corolla can easily be lifted intact from the ovary and stigma. At the base, the corolla is thickened for a millimeter or more in length as though bound by a rubber band. The stamens adhere to the walls of the corolla.

The ovary is thicker than in most species, 4 mm. in diameter. The style is also thickened and the stigma is crenately two-lobed. In the type the pedicel is very short, 5 mm. or less. However, in the fragmentary *Mutis 1116* the pedicel is approximately 2 cm. long. This is the only difference between the two specimens.

18. *Ternstroemia distyla*, sp. nov.

Ramuli subverticillati, grisei, teretes. Folia coriacea, elliptico-lanceolata, 4.5-6.5 cm. longa et 1.0-1.5 cm. lata, apice basique acuta, margine plana vel subrevoluta, distincte denticulata, subtus punctata, costa supra canaliculata, subtus leviter elevata, nervis non visibilibus, petiolis 5-7 mm. longis. Flores non visi. Fructus (probabiliter immaturus) solitarius, conicus, ca. 5-8 mm. longus et basi 5-7 mm. diam., 2-loculatus, pauci-seminatus (ca. 4), pedicellis gracilibus saepe recurvatis 1.3-1.7 cm. longis, bracteolis 2 oppositis ovatis 1.5-2.0 mm. longis et ca. 1.5 mm. latis, margine sparsissime glanduloso-denticulatis; sepala 5, imbricata, semiorbicularia, 3-5 mm. longa et ca. 4 mm. lata, apice rotundata vel obtusa, exterioribus sparsissime glanduloso-denticulatis, interioribus integerrimis; stylo persistente brevissime ca. 1 mm. longo 2-partito ad basim libero, stigmatibus 2 subcapitato-riniformibus.

DISTRIBUTION: Venezuela.

VENEZUELA: Mount Auyan-Tepui, alt. 1850 m., *G. H. H. Tate s.n.* (NY, TYPE), Dec. 1937 - Jan. 1938.

This species, although the type presents only immature fruit, is distinct because of the very short, persistent style which in most instances is two-

parted to the base. The elliptic-lanceolate leaves, distinctly crenulate, is another unusual character.

19. ***Ternstroemia tristyla*** Gleason in Bull. Torrey Bot. Club, **58**: 398. 1931.

DISTRIBUTION: Venezuela.

VENEZUELA: Mount Duida, Brocchinia Hills, alt. 1350 m., *G. H. H. Tate 584* (TYPE, NY), Jan. 4, 1929 (sepals involute, dull pink).

Branchlets terete, gray. Leaves coriaceous, cuneate, sessile, 2.5–3.0 cm. long, 1.0–1.3 cm. wide, rounded to a minutely retuse apex, cuneate at base, the margin subrevolute with minute glandular teeth, veinless except for an inconspicuous midrib, plane above and slightly raised below. Flowers solitary axillary; pedicels compressed, ca. 1.5 cm. long; bracteoles 2, opposite, chartaceous, oblong-linear, ca. 5 mm. long, 1.25 mm. wide, carinate, glandular-denticulate; sepals 5, imbricate, long and sharp-pointed, involute, 13–15 mm. long, ca. 5 mm. wide at base, pergamentaceous, the outer-lobes sparsely glandular-denticulate; petals 5, imbricate, long-acuminate, resembling calyx in shape, involute, 7–9 mm. long, 2.5–3.0 mm. wide, free nearly to the base; stamens bi-seriate, ca. 35, unequal, 2.5–4.0 mm. long in same series, the filaments variable, 0.5–2.0 mm. long in same series, thick and short to long and slender, connate, adnate to base of corolla, the anthers oblong-linear, 1.5–2.0 mm. long, the connective projected into an acumen up to 0.5 mm. long; ovary very short, rather broad-flattened, 2-celled, each cell 5–6-ovulate, the style 7 mm. long, 2-parted for 3 mm., the 2 pistils punctiform. Fruit not seen.

Following is an enumeration of the outstanding characters of this species: (1) leaves cuneate and sessile, veinless and glandular-margined; (2) style distinctly 2-parted for nearly one-half its 7 mm. length; (3) bracteoles semi-foliaceous, 5 mm. long; (4) sepals and petals long-acuminate and involute, tapering nearly their entire length to sharp pointed apices.

From my study, it appears that *T. tristyla* is an unfortunate name for the species. On the type specimen were two flowers, one of which I carefully boiled and dissected. In a packet on the herbarium sheet were fragments of former dissections. In all, there were styles of four flowers available for observation. These were carefully examined under a high-powered binocular and in each case the style proved to be 2-parted with no evidence of a third part having broken off. To substantiate the observation, the ovary in the flower which I dissected proved to be clearly 2-celled with 5 ovules in one cell and 6 in the second cell. The style is free-parted for less than one-half its entire length and hence should be considered a single style, two-parted at the apex.

In floral characters this species is identical with *T. pungens* Gleason. The sessile, smaller cuneate leaves only sparsely punctate below are the only features separating the two species.

20. ***Ternstroemia grandiosa***, sp. nov.

Arbor 12 metralis, ramulis crassis teretibus griseis. Folia crasso-coriacea, oblongo-obovata, 13–19 cm. longa et 5–8 cm. lata, apice obtusa, abrupte acuminata, basi late cuneata, subtus punctata, margine subintegerrima, pauce glandulosa-denticulata, subplana, costa supra canaliculata, subtus elevata, venis 18–20 paribus supra obscuris, subtus subconspicuis, petiolis



crassis, 1.5–2.5 cm. longis. Flores solitarii, pedicellis 1–2 cm. longis, bracteolis 2 inaequalibus longo-ovatis vel lato-ovatis,  $6 \times 3\text{--}4$  mm. et  $8 \times 4$  mm., margine glanduloso-denticulatis; sepala 5, imbricata, crassa, ovata vel lato-ovata, inaequalia, 9–12 mm. longa et 7–10 mm. lata, exterioribus margine profunde glanduloso-denticulatis, interioribus margine scariosis; petala 5, lanceolata, 9–10 mm. longa et ca. 3 mm. lata, longo-acuminata, basi 5 mm. connata, apice revoluta; stamina ca. 20, ut videtur uni-seriata, inaequalia, crassa sed fragilia, filamentis crassis 1–2 mm. longis, antheris linearibus ca. 3 mm. longis, connectivo ca. 1 mm. projecto; ovarium subconicum, ca. 2 mm. longum et basi 2 mm. diametro, 2-loculatum, loculis 2-ovulatis, stylo 2-partito, ca. 6.5 mm. longo, apice ad 2 mm. plusve libero, stigmatibus 2 punctiformibus. Fructus ignotus.

DISTRIBUTION: British Guiana.

BRITISH GUIANA: Upper Mazaruni District, trail leading to Kamarang from the Kurupung River, on rocky soil, *A. S. Pinkus* 4 (TYPE, NY; US), Sept. 13, 1938 (tree 40 ft. high; trunk 8 in. diam.; flowers flesh-colored).

This species is characterized by the following: (1) tree 12 m. high; (2) thick-coriaceous leaves, punctate on the lower surface; (3) deeply glandular-denticulate outer calyx-lobes; (4) long-acuminate petals, 9–10 mm. long; (5) few stamens (20); (6) long two-parted style.

Most closely related to this species is *T. Gleasoniana*, agreeing in the very large leaves which, however, are thicker, smoother in texture and distinctly free from punctations on the lower surface. As another distinguishing feature, *T. Gleasoniana* has flowers with glandular-denticulate bracts at the base of the pedicels. The sepals of the latter are suborbicular, at least the outer lobes, and are only sparsely glandular-denticulate. The style, in the latter species, is definitely entire.

## 21. *Ternstroemia Krukoffiana*, sp. nov.

Arbor 20 metralis (fide Krukoff). Folia coriacea, oblongo-obovata vel oblongo-elliptica, 12–20 cm. longa et 4–5 cm. lata, apice obtusa, abrupte acuminata, basi longo-attenuata in petiolum 2.0–3.5 cm. longum, margine leviter glandulosa ut videtur integerrima, plana vel leviter revoluta, costa supra canaliculata, venis 12–16 paribus supra manifestis subtus obscuris. Flores non visi. Fructus maximus, ovalis vel globoso-ellipticus, 4.0–5.5 cm. longus et 3.5–4.0 cm. diam., biloculatus, loculis solitario-seminatis, seminibus eis *Amygdali* similibus, pulpa carnosa indurata asperatis, ca. 3 cm. longis et 1.5 cm. latis. Pedicelli axillares, solitarii, 2–3 cm. longi, crassi, lignosi, 4 mm. diam., bracteis 2 oppositis 4–5 mm. longis, margine scariosis. Sepala 5, imbricata, pergamentacea, obovata, 8–10 mm. longa et 7–8 mm. lata, margine scariosa, non glanduloso-denticulata.

DISTRIBUTION: Brazil.

BRAZIL: State of Amazonas, Municipality Humayta, on plateau between Rio Livramento and Rio Ipixuna, terra firma, *B. A. Krukoff* 7180 (TYPE, AA; ISOTYPE, FM, NY), Nov. 7–18, 1934 (tree 70 ft.).

Probably the largest fruit of the genus, at least in the Americas, is found in this species (4.0–5.5 cm. long, 3.5–4.0 cm. wide). Furthermore, only one or two seeds are produced. These seeds (when two) fill the fruit case, one to each cell, appear quite similar in appearance to the seed of the almond, and are covered with a reddish brown pulp. Upon drying this

pulp shrinks and cracks into hardened portions which, in turn, appear almost as a crusty stellate pubescence. Whereas in other species this covering is quite powdery or mealy and can be rubbed off easily with the finger, in this species it can be removed only with the aid of a knife or some other sharp implement.

For a species with such unusually large fruit, the calyx-lobes are comparatively small, usually less than 1 cm. long and 7-8 mm. wide. The leaves are oblong-obovate to oblong-elliptic, abruptly acuminate at the apex and tapering gradually at the base into a petiole 3 cm. long, which appears considerably longer because of the extensive tapering of the leaf base.

Most closely allied is *T. macrocarpa* Tr. & Pl., which can be separated from the present new species by: (1) smaller fruit (up to 2.5 cm. long, 2 cm. wide) with 16-18 flat, smooth grayish seeds (7-8 mm. long); (2) shorter and wider leaves abruptly cuneate at the base with 9-11 pairs of veins; (3) much larger calyx-lobes, up to 20 mm. long, 11-14 mm. wide.

It is a pleasure to name this species for Mr. B. A. Krukoff, whose extensive collections in South America and whose interest in the flora of that region are well known.

22. ***Ternstroemia pachytrocha*, sp. nov.**

Habitus ignotus. Folia crasso-coriacea, late elliptica vel obovata, 6-8 cm. longa et 3.5-4.5 cm. lata, apice rotundata, subinde subretusa, basi obtusa, in petiolum attenuata, subtus punctata, margine plana integerrima, cum paullis glandulis, costa supra canaliculata, subtus elevata, basi crassa, ca. 3 mm. diam., apice evanida, venis 5-6 paribus, supra profunde vel tenuiter impressis, subtus inconspicuis, petiolis crassis, 5-6 mm. longis. Flores non visi. Fructus subglobosus, 1.7-2.5 cm. longus et 2.2-2.5 cm. diam., 2-loculatus, loculis 5-8-seminatus, seminibus 6-8 mm. longis et 5-7 mm. latis, fructus pericarpio crassissimo 4-6 mm. lato. Pedicelli axillares, solitarii, crassi, 3-4 cm. longi, bracteolis 2 oppositis late ovatis, quam longis latoribus, ca. 3 mm. longis et 5 mm. latis, apice subapiculatis; sepalis 5 imbricatis suborbicularibus, quam longis latoribus, 9-13 mm. longis et 10-15 mm. latis, margine (ut videtur) integerrimis, non glanduloso-denticulatis.

DISTRIBUTION: Peru.

PERU: Dept. Huanuco, Pampayacu, *R. Kanehira* 44 (TYPE, G), Jan. 13, 1927.

Although described from a very poor herbarium specimen, this species is outstanding among all South American species for the large, very thick-walled fruit, from which it derives its name. The pericarp is 5-6 mm. thick and gives the seeds the appearance of being carelessly imbedded in the center of a spongy matrix. Like *T. macrocarpa* Tr. & Pl. and *T. Krukoffiana* Kob., the fruits are borne on strong pedicels. Only a few veins (5 or 6 pairs) are found on the suborbicular leaves. These are deeply and finely impressed on the upper surface but inconspicuous below. Both the sepals and bracteoles are large, wider than long, and the latter are placed close to the sepals.

The species most closely related is *T. macrocarpa* from Colombia. This latter species, although characterized by equally large fruit, can be sep-

arated by the thin wall of the fruit, the larger leaves 9-16 / 5-8 cm. with veins conspicuously elevated on both surfaces and the triangular-shaped, keeled bracteoles placed lower on the pedicel.

23. *Ternstroemia macrocarpa* Triana & Planchon in Ann. Sci. Nat. sér. 4. 18: 259. 1862.—Melchior in Notizbl. Bot. Gart. Mus. Berlin. 13: 499. 1937. Non Scheffer, 1870.

DISTRIBUTION: Colombia.

COLOMBIA: Forests around Quindio. Goudot, n. (photo and fragment of type, FM).—Without definite locality, P. C. Lehmann B.T.262 (NY), B.T.971 (NY), B.T.1202 (FM, G).—Dept. El Cauca, Mount El Troena, Cordillera Occidental shrub-zone ("paramillo"), alt. 2700-3000 m., P. W. Pennell 7547 (G, NY, US.).

Tree. Leaves oblong-obovate, 9-16 cm. long, 5-8 cm. wide, coriaceous rounded or obtuse at apex, obtuse to subcordate at base 9-11 pairs of veins conspicuous on both surfaces, granular or dark punctate, the margin subcrenulate, plane or slightly revolute, the petiole up to 2 cm. long. Flowers axillary, solitary, the pedicel 2.5-4.5 cm. long, thick 4-5 mm. diam. at apex, bracteoles 1, subopposite, 5-7 mm. below calyx, thick, triangular-keeled, 4 mm. long, the margin scarious, not glandular, calyx-lobes 5, imbricate subobovate, concave, subtrilobed, 11-11 mm. long, 11-14 mm. wide (fruiting calyx up to 10 mm. long), the margin scarious, not glandular-denticulate, petals 5, imbricate, subtrilobed, 11-11 mm. long, membranaceous, stamens 15-20, ca. 10, the filament short 1-2 mm. long, joined at the base and adnate to the corolla, the anther linear, 4-5 mm. long, short apiculate, very apical ca. 4 mm. diam., 2-celled (occasionally 3-celled), few anules attached at center of ovary near top, the style short, thick 1.5-4.0 mm. long, the stigma capsule 2-3-lobed. Fruit conical, oval up to 3.5 cm. long, 3 cm. diam., 16-18 seeded. Seeds quite flat, 7-8 mm. long, 5-6 mm. wide.

This species is characterized by large leaves, 9-16 cm. long, 5-8 cm. wide; strong pedicels 2.5-4.5 cm. long, 4-5 mm. thick; large subglobose calyx-lobes 11-11 mm. long (up to 10 mm. long in fruit), 11-14 mm. wide, scarious-margined; large conical fruit up to 3.5 cm. long, 3 cm. wide with 16-18 flat seeds (7 mm. long).

Most closely allied to this species is *T. Kraussiana* which has still larger fruit, 4.5-5.5 cm. long and 3.5-4.0 cm. wide, with only one or two huge seeds 3 cm. long and 1.5 cm. wide, calyx lobes (fruit) not more than 1 cm. long and 0.7 cm. wide, large leaves tapering gradually at the base into a petiole 3 cm. long. Also closely related is *T. paraguayana* which can be separated mainly on the very thick pericarp (5-6 mm. thick), the smaller leaves with fewer veins (5-6 pairs), which are deeply impressed above and inconspicuous below and the broadly ovate bracteoles wider than long and placed close to the sepals.

24. *Ternstroemia camelliaefolia* Linker & Reuter, Trans. Roy. Linne. Soc. Bot. Colomb. 1: 56. 1863.—Melchior in Nat. Pflanzenfam. ed. 2. 21: 142. 1925.—Sprague in Kew Bull. 1926: 42. 1926.

*Ternstroemia dentata* Swartz var. *S. nudiflora* Choisy in Mém. Soc. Phys. Hist. Nat. Genève, 1: 106 (Mém. Ternstr. 13). 1855.

*Ternstroemia brevipes* Choisy in Mém. Soc. Phys. Hist. Nat. Genève. 1: 103 (Mém. Ternstr. 15). 1855. Pro parte.



*Ternstroemia brevipes* var. *Blanchetii* Wawra in Martius, Fl. Bras. **12**<sup>1</sup>: 275. 1886. — Non Choisy.

*Ternstroemia nudiflora* (Choisy) Urban in Bot. Jahrb. **21**: 529. 1896. (In observ.)

DISTRIBUTION: Venezuela.

VENEZUELA: State Merida, few miles southeast of Colonia Tovar, alt. 1830 m., *A. Fendler* 50 (G), Apr. 8 & June 22, 1854 and March 14 & May 7, 1855 (tree; fruit opening irregularly; calyx rough, subtended by small bracts). — Colonia Tovar, alt. 2200 m., *A. Jahn* 332 (US), Apr. 1914 (vernacular name "carne asoda"). — Cerro de Turumiquiere, sub-paramo, alt. 1800–2100 m., *G. H. H. Tate* 235 (US).

Tree. Leaves oblong-obovate to broadly obovate, coriaceous, 6–10 (–12) cm. long, 3–5 cm. wide, obovate or obtusely acuminate at apex, broadly cuneate at base, green above, reddish tan and dark punctate below, the midrib canaliculate above, raised below, the veins (7–8 pairs) hardly conspicuous above, more evident below, the margin crenulate toward the apex, subrevolute to revolute, the petiole thickened at base 0.8–1.2 cm. long. Flowers axillary, crowded at apex of branchlets, the pedicels short, thick, 4–7 mm. long, 2–3 mm. diam.; bracteoles 2, opposite, subrotund, 3–4 mm. long, a trifle wider, broadly emarginate and cuspidate at apex, almost as large as outer lobes of calyx, the margin scarious, not glandular-denticulate; calyx-lobes 5, imbricate, concave, subrotund, increasing gradually in size from the outer (ca.  $5 \times 7$  mm.) to the inner ( $8 \times 8$  mm.), pergamentaceous, concave, the margin scarious, not glandular-denticulate; petals 5, imbricate, joined at base, broadly obovate, 10–11 mm. long, 6–8 mm. wide, scarious-margined; stamens numerous, ca. 5–6 mm. long, anthers and filaments of about equal length, the anthers oblong, not apiculate; ovary abruptly conical, ca. 2.5–3.5 mm. diam., 3-celled, each cell 2-ovulate, sometimes sub-6-celled, the style 3–4 mm. long the stigma tri-crenate, extending well out from the style. Mature fruit (fragmentary) 3 cm. long, the seeds 1 cm. long, probably 6–8 in single fruit; immature fruit (seemingly mature) 1 cm. long.

The outstanding characteristics of this species are (1) the very short, thick pedicels; (2) the scarious margins of the bracteoles and calyx-lobes; (3) the obtuse apex of the anthers; (4) the 3-celled (or 6-celled) ovary and fruit; (5) the tri-crenate stigma; and (6) the large (3 cm. diam.) fruit.

Urban (Fl. Ind. Occ. **3**: 78. 1902), in a bibliographical sketch of Linden, states that only five copies of Linden & Planchon's "Troisième Voyage de J. Linden, Botanique, Plantae Colombianae," in which this species was described, were distributed and that these were allotted to Linden, three other botanists including Urban, and one botanical garden (Brussels). In the same discussion Urban intimates that he considers this distribution of literature to constitute valid publication. Perhaps Urban's comment that only five copies of this work were distributed might be an understatement, since the Arnold Arboretum Library is in possession of a copy procured through Friedländer & Sohn in December, 1911 and Kew also acquired a copy in 1921 from Edouard André. Others may maintain that such a publication does not measure up to Article 35 of the International Code of Botanical Nomenclature (Brussels), since supposedly there was no actual *public* sale or distribution of this work. This becomes merely a matter of personal interpretation. Since a copy of Linden & Planchon's work is at my disposal I would not, under ordinary circumstances, be aware of the

rarity of the publication and would accept the name *T. camelliaefolia* without further thought.

Strangely enough, the only other published name to challenge Linden & Planchon's species is one provided by Urban himself. Urban's combination *T. nudiflora* was made in his observation on West Indian species, and at that time, I am certain, that although he was one of the few to possess Linden & Planchon's publication, he did not realize the existence of *T. camelliaefolia*. He was concerned over *T. brevipes* Choisy, *T. dentata* var.  $\beta$ . *nudiflora* Choisy and *T. brevipes* var. *Blanchetii* Wawra. Hence there is no relationship between his *T. nudiflora* (1896) and his statement (1902) concerning the validity of the work of Linden & Planchon.

However, Urban's *T. nudiflora* (1896) was based on *Funck & Schlim* 173, the same specimen used by Linden & Planchon as the type of *T. camelliaefolia* (1863) and by Choisy as the type of *T. dentata* var.  $\beta$ . *nudiflora* (1855). Later, Melchior (1925), conscious of the two entities, accepted the name *T. camelliaefolia* and reduced *T. nudiflora* to synonymy.

In the copy belonging to the Arnold Arboretum, Linden & Planchon list *T. dentata* var.  $\beta$ . *multiflora* Choisy as a synonym of this species. This was obviously a "lapsus calami," corrected by Sprague (1926) and listed as "*Ternstroemia dentata*  $\beta$ . *nudiflora*" in the republication of Linden & Planchon's new species presented in the Kew Bull. (1926). Sprague, at the same time in an editorial note, stated that *Fendler* 50 and *Moritz* 1679 were determined by Triana as *T. camelliaefolia*. Since *Fendler* 50 has been available for my study, the clue given by Sprague has proved most valuable because Linden & Planchon's description was very incomplete and quite worthless without the type, which I have not seen. However, the dissections from *Fendler* 50 and Urban's brief but important supplementary description show that the specimens cited above are true representatives of *T. camelliaefolia*.

25. *Ternstroemia duida* Gleason in Bull. Torrey Bot. Club, **58**: 400. 1931.

DISTRIBUTION: Venezuela.

VENEZUELA: Mount Duida, slopes of Ridge 25, alt. 1700–1800 m., *G. H. H. Tate* 459 (TYPE, NY), Nov. 26 – Dec. 16, 1928 (shrub 6 ft. high; both calyx and corolla pinkish white).

Small shrub 2 m. high with branchlets slender, verticillate, finely striate. Leaves coriaceous, linear-oblancoolate, 3–5 cm. long, 0.4–0.6 cm. wide, obtuse at the apex, long-cuneate at the base, the margin entire dotted with a few glands, the midrib impressed above, plane below, the veins not visible, the petiole up to 4 mm. long. Flowers few, solitary, axillary, the pedicels slender, recurved, up to 3 cm. long; bracteoles 2, ovate-lanceolate, 4–7 mm. long, the margin entire, perhaps with only an occasional minute glandular-denticulation; sepals 5, imbricate, broadly ovate, ca. 10 mm. long, 6–7 mm. wide, abruptly acuminate-tipped at the apex, the margin of the outer lobes subscarios, that of the inner more so; petals 5, ovate, 9–10 mm. long, 2.5–3.0 mm. wide, long-acuminate, joined at the base for 6 mm.; stamens 30+, unequal, 5–7 mm. long, the filaments somewhat thick, short, 1–2 mm. long, the anthers linear 3–4 mm. long, the connective projecting into an acumen ca. 1 mm. long; ovary conical, ca. 2 mm. long, 2-celled, few-ovulate,

tapering into stout style 5–6 mm. long, ca. 1 mm. diam. near base, the stigma punctiform.

This excellent species is characterized by: (1) linear-oblong leaves, 3–5 cm. long, 0.4–0.6 cm. wide; (2) pinkish white calyx and corolla of nearly equal length (ca. 10 mm.), both long-acuminate with the latter joined for nearly two-thirds its entirety; (3) the large thick stamens; (4) the two-celled ovary; (5) the stout long (6 mm.) style and (6) the fine punctiform stigma.

25A. *Ternstroemia duidae* Gleason forma *latifolia*, nom. nov.

*Ternstroemia paucifolia* Gleason in Bull. Torrey Bot. Club, **58**: 401. 1931.

DISTRIBUTION: Venezuela.

VENEZUELA: Mount Duida, crest of the Savannah Hills, alt. 1300 m., G. H. H. Tate 859 (TYPE of *T. paucifolia*, NY), Aug. 1928 – Apr. 1929.

Leaves coriaceous, oblong-cuneate, up to 5 cm. long, 0.6–1.5 cm. wide, rounded, occasionally retuse at apex, long-acuminate at base. Fruit globose, ca. 1.3 cm. diam., 2-celled, 6–8-seeded, the seeds ca. 6 mm. long.

This form is merely a wide-leaved variation of the typical *T. duidae*. Also, it is a fruiting specimen, whereas the species is flowering. The stout style (5–6 mm. long) is persistent and very noticeable. I have selected the name forma *latifolia* in preference to the rather meaningless *paucifolia*. The specimen itself, true enough, has only a single leaf attached at present. However, there are fifty or more leaves loose in an attached packet, which is a considerable number for any specimen of *Ternstroemia*.

26. *Ternstroemia Lehmannii* (Hieronymus) Urban in Bericht. Deutsch. Bot. Gesell.

**14**: 42. 1896. — Melchior in Nat. Pflanzenfam. ed. 2, **21**: 142. 1925.

*Taonabo Lehmannii* Hieronymus in Bot. Jahrb. **20**, Beibl. **49**: 48. 1895.

DISTRIBUTION: Ecuador.

ECUADOR: Prov. Azuay, western slopes of the West Andes of Cuenca, in dense forests near Chagal and Mollenturo, alt. 2000–2800 m., F. G. Lehmann 6674 (ISOTYPES, FM, G, US), Nov. 30, 1893 (tree up to 5 m. high with squarrose and candelabrum-shaped crown of branches; leaves leathery yellow-green, slightly shiny; flowers white).

Small trees up to 5 m. with verticillate, terete, brown or brownish-gray branchlets. Leaves oblong-obovate or rarely elliptic, 8–10 cm. long, 3.5–4.5 cm. wide, coriaceous, obtuse at the apex, contracted into a blunt acumen, rarely subrotund, attenuated at the base into a stout petiole (5–10 mm. long), the margin revolute or subrevolute, subcrenate-serrate, the midrib canaliculate above, prominent below, the veins (8–12 pairs) hardly conspicuous. Flowers axillary, solitary, quite large when open, about 2 cm. across; pedicels sturdy, 1.5–1.7 cm. long; bracteoles 2, opposite, unequal, broadly ovate-triangular or suborbicular, 4–5 mm. long, 3–4 mm. wide, the margin quite entire, with only an occasional glandular-denticulation, subcarinate, mucronate; sepals 5, imbricate, pergamentaceous, suborbicular, unequal, 6–8 mm. long, 7–8 mm. wide, the margin entire, not glandular-denticulate; corolla 8–10 mm. long, the petals joined at base into a campanulate tube 3–4 mm. long, the 5 free petal parts obovate, 7–8 mm. wide, emarginate at the apex; stamens very numerous, over 200, about 5 mm. long, the filaments 3 mm. long, slender, joined at base into a band 2 mm. wide, which in turn is adnate to corolla, the anthers oblong-linear, 2 mm. long, the connective shortly mucous; ovary conical, 2.5 mm. long, 3 mm.



diam. at base, 2-celled, each cell 2-4 ovulate, the style 2.5 mm. long, the stigma bilobed peltate. Fruit not seen.

This is the only species of *Ternstroemia* recorded from Ecuador and the type material cited above is the only material from Ecuador examined in this study. Growing on the western slope of the Andes Mts., it is quite distinct from most other species of the genus.

The outstanding characters are the very large flowers (2 cm. across), the orbicular, eglandular and entire bracteoles and sepals, the very numerous stamens (200+) and the 2-celled ovary. Hieronymus reports the ovary cells to be 2-ovulate. In some of the specimens examined I found as many as four ovules in a single cell.

27. *Ternstroemia meridionalis* Mutis ex Linn. f., Suppl. 264. 1781.—Willdenow, Sp. Pl. **2**(2): 1128. 1799.—H. B. K., Nov. Gen. et Sp. **5**: 160. 1821.—Smith in Rees, Cyclop. **35**: no. 1, 1817.—Choisy in Mém. Soc. Phys. Hist. Nat. Genève, **14**: 102 (Mém. Ternstr. 14). 1855.—Triana & Planchon in Ann. Sci. Nat. sér. 4, **17**: 258. 1862.—Melchior in Nat. Pflanzenfam. ed. 2, **21**: 142. 1925. Non Swartz (1788).

*Ternstroemia brevipes* De Candolle in Mém. Soc. Phys. Hist. Nat. Genève, **1**: 409 (Mém. Ternstr. 17). 1822; Prodr. **1**: 523. 1824.—Pro synonym.

*Ternstroemia meridionalis* Mutis ex Linn. f. var. *nigricans* Choisy in Mém. Soc. Phys. Hist. Nat. Genève, **14**: 103 (Mém. Ternstr. 15). 1855.—Triana & Planchon in Ann. Sci. Nat. sér. 4, **17**: 258. 1862.

*Ternstroemia andina* Wawra in Martius, Fl. Bras. **12**<sup>1</sup>: 278. 1886.—Melchior in Nat. Pflanzenfam. ed. 2, **21**: 142. 1925.

*Mokofua andina* (Wawra) O. Kuntze, Rev. Gen. Pl. **1**: 63. 1891.

*Mokofua meridionalis* (Mutis ex Linn. f.) O. Kuntze, Rev. Gen. Pl. **1**: 63. 1891.

*Taonabo meridionalis* (Mutis ex Linn. f.) Szyszylowicz in Nat. Pflanzenfam. III. **6**: 189. 1893.

*Taonabo andina* (Wawra) Szyszylowicz in Nat. Pflanzenfam. III. **6**: 189. 1893.

DISTRIBUTION: Colombia.

COLOMBIA: Dept. Cundinamarca: *J. C. Mutis* 1115 (US), 1117 (US), 2453 (ISOTYPE, US), 2475 (US), 3917 (US), 4605 (US).—Vicinity of Bogotá, between El Delirio and Guadalupe, alt. 3000 m., *J. Cuatrecasas* 5139 (US), May 28, 1939 (tree with white flowers).—Near Bogotá, Quebrado de Chicó, alt. 2800 m., *J. Cuatrecasas* 5401 (US), June 8, 1939 (tree with white flowers).—Vicinity of Bogotá, Monserrate, páramo, alt. 3000 m., *J. Cuatrecasas* 7999 (US), Jan. 28, 1940 (tree 3-4 m. with white flowers).—Near Bogotá, *Bro. Ariste-Joseph s.n.* (US) 1921.—Páramos de Bogotá, *M. T. Dawe* 148 (US), March 1916.—Río San Cristobal, near Bogotá, bushy mountain valley, alt. 3000-3300 m., *F. W. Pennell* 2046 (G, NY, US), Sept. 1917 (shrub with white flowers).—Cerro de Focha, near Bogotá, rocky open páramo, alt. 3100-3200 m., *F. W. Pennell* 2208 (G, NY, US), Sept. 1917 (shrub). Dept. Bolivar: Cordillera Occidental, below Páramo de Chaquiro, shrub zone, alt. 3000 m., *F. W. Pennell* 4371 (NY), Feb. 24, 1918 (shrub with white flowers and yellow fruit). Dept. Antioquia: Cerro de la Vieja, alt. 2700 m., *Bro. Daniel* 1692 (US), Dec. 26, 1938. Dept. Santander del Norte: Ocaño, páramos, alt. 3000 m., *L. Schlim* 439 (isotype of *T. andina*, FM), Feb. 1853 (flowers white). Without definite locality, *Purdie s.n.* (G).

Tree or shrub with terete, rugulose branches; branchlets fasciculate (4-6), terete, rugulose, glabrous, grayish. Leaves shortly petiolate (3-5 mm. long), heavy-coriaceous, oblong-obovate, 2-4(-5) cm. long, 1.5-2.0 cm. wide, obtuse at apex, emarginate, subcuneate at base, the margin revolute, usually entire, occasional signs of glandular-serrulation, the midrib canaliculate above, evident the entire length, prominent below, the veins

obscure on both surfaces. Flowers axillary, solitary; peduncles compressed, 5–10 mm. long, occasionally shorter; bracteoles 2, opposite or subopposite, unequal, variable, usually broadly ovate to suborbicular, retuse, semi-beaked at the apex, occasionally triangular, sparsely glandular-denticulate along the margin. Calyx-lobes 5, suborbicular, varying in size, the outer sepals smaller, ca. 5 mm. long and 5 mm. wide, concave, quite thick, the margin scarious, entire, with only an occasional evidence of glandular-denticulation, the inner lobes increasingly larger, up to 8 mm. long and 9 mm. wide. Petals 5–6, white, subcrassulate, ca. 12 mm. long, 10–12 mm. wide, joined for 3 mm. at base, obovate, suborbicular at apex, the margin scarious. Stamens ca. 125, seemingly bi-seriate, unequal, adnate to the base of the corolla; filaments ca. 3 mm. long, joined at base for 2 mm.; anthers oblong-linear, apiculate, ca. 3 mm. long. Ovary hemispherical or subglobose, ca. 3 mm. diam., 2-celled, each cell ca. 5-ovulate, the ovules attached at central axis; style ca. 4 mm. long and 1 mm. diam.; stigma peltate, 2-lobed, the margin crenate. Fruit subrotund-ovate, few-seeded.

Choisy (1855) designated, as distinct, the var. *nigricans* as follows: “feuilles plus évasées en haut, noircissant fortement à la surface supérieure qui est alors rude au toucher.” The specimen collected by Purdie (*s. n.*) in Colombia was cited. A duplicate specimen found in the Gray Herbarium shows the apex of the leaf to be no wider than the apices of most specimens, the upper surface is not especially blackened and does not seem rough to the touch. Later Triana and Planchon (1862), recognized this variety and cited also *Schlim* 439, a duplicate of which also is deposited at the Gray Herbarium. Further descriptive notes concerning the pedicel, “des pédicelles comprimés et à peu près de moitié longueur de la feuille; mais ce caractère doit être variable, puisque dans la variété *nigricans* ils sont très-courts, également à peine la calice, et plutôt obscurément tetragones que comprimés” are added. The pedicel is much too variable to be used as a distinguishing character as a survey of a large number of specimens shows. Usually, the pedicel measures 8–10 mm. However, in *Mutis* 1117 and *Pennell* 4371, the measurement is 4–6 mm., in *Bro. Daniel* 1692, 3–5 mm., in *Schlim* 439, subsessile (apical) — 3 mm. (lateral). In a recent collection, *Cuatrecasas* 5401, the pedicels along the branchlets measure 9 mm. while those at the apex are subsessile. Furthermore, the 4-angled character of a subsessile pedicel which is supposedly compressed in the species is drawing too fine a point. Even the “compressed pedicel” is not a consistent character.

In 1886, Wawra described *T. andina* as new and designated *L. Schlim* 437 as the type. An examination of a photograph of the type clearly shows the number to be 439 and an annotation on the sheet says that the specimen had been cited as no. 437. Wawra's description is rather incomplete and the isotype examined lacked good flowering or fruiting material.

Two specimens, *Killip & Smith* 20626 and 20677 (AA, FM, G, NY, US), collected in Dept. Santander del Norte, have leaves which are much narrower than the specimens cited above. However, since in all other respects they agree with the characters of the species, I do not hesitate in placing them here.

28. **Ternstroemia Jelskii** (Szyszyłowicz) Melchior in Nat. Pflanzenfam. ed. 2, **21**: 142. 1925.

*Taonabo Jelskii* Szyszyłowicz in Nat. Pflanzenfam. III. **6**: 189. 1893; in Diss. Cl. Math.-Phys. Acad. Litt. Cracov. **29**: 224. 1894.

DISTRIBUTION: Peru.

PERU: Dept. Piura, Cordillera Guamani, between Huancabamba and Ayavaca, alt. 2900–3000 m., *A. Weberbauer 6341* (FM, G, US), May 1912 (shrub 2 m. high with white flowers).—Dept. Cajamarca, Cutervo, *C. Jelski 254* (photo of TYPE, FM, G).—Dept. San Martín, near Tarapoto, *R. Spruce 4241* (G, NY, photo FM).—Dept. Huánuco, between Huánuco and Pampayacu, alt. 2700–3000 m., *R. Kanehira 68* (G), Jan. 13, 1927.—Dept. Huánuco, Panao, alt. 2750 m., *J. F. Macbride 3610* (FM, G, US), May 1923 (small shrub-tree).—Dept. Huánuco, Yanano, rocky places, alt. 1830 m., *J. F. Macbride 3777* (FM, G, US), May 1923 (shrub-tree; flowers and fruit yellow; anthers red).

According to Szyszyłowicz, this species is characterized by elliptic leaves, 3.5–4.0 cm. long, 1.5–2.0 cm. wide, shining green above, opaque below, the petiole very short. Flowers solitary, pedunculate, axillary; sepals 4–5 mm. long, rounded, broadly ovate, entire; petals orbicular; stamens 2-more-seriate, much shorter than petals, the filaments thick, the anthers oblong, minutely caudate; ovary complanate-globose, 2-celled, the style 1.5–2.0 mm. long; the stigma peltate, subbifid. Fruit ovoid, 1.2–1.4 cm. long; seeds 4, 7 mm. long.

No mention is made of the bracteoles and no measurements are given for the petioles, pedicels, petals and stamens.

All specimens cited above are poor and cannot be diagnosed with surety. They all have in common rounded calyx-lobes (*Weberbauer 6341* [4–5 mm. long], the others ca. 3 mm. long), very minute bracteoles, short petioles and pedicels. Also, all possess elliptic to obovate leaves, shining above, opaque below, ca. 4 cm. long and 2 cm. wide. The Macbride specimens are fruiting specimens and have 2-celled fruits which are four-seeded. *Weberbauer 6341* has short (0.5 mm.) sturdy pedicels, whereas all other numbers have pedicels approximately twice as long and more graceful. The type, according to Szyszyłowicz, has stamens, the filaments of which are thick. In the specimens examined, the filaments are long and slender, well exceeding the anthers in length.

29. **Ternstroemia oligostemon** Krug & Urban in Bot. Jahrb. **21**: 534. 1896.—Melchior in Nat. Pflanzenfam. ed. 2, **21**: 142. 1925.—R. O. Williams, Fl. Trinidad & Tobago, **1**: 70. 1927.

DISTRIBUTION: Tobago, Trinidad.

TOBAGO: The Widow, *W. E. Broadway 4154* (FM, Mo, US), Sept. 29, 1910 (shrub with white, sweet-smelling flowers).—Easterfield, *W. E. Broadway 4369* (FM), Dec. 16, 1912 (bark of trunk rough and dark in color; leaves glossy green).—Slopes of main ridge above Parlatuvier, relict forest bordering cultivations, *N. Y. Sandwith 1916* (NY), Oct. 24, 1937 (middle-sized tree with white flowers).—Exact locality missing, *F. A. "Durity" 12620* (NY), Jan. 21, 1932.

This species is characterized by obovate or narrowly obovate-elliptic leaves, 6–10(–14) cm. long and 2.5–5.0 cm. wide, shortly or obtusely acuminate at the apex, long-attenuately tapering at the base into a petiole 8–13 mm. long, the margin subrevolute, crenulate or occasionally entire, frequently glandular, the 10–15 pairs of rather straight veins conspicuous on the lower surface, sometimes obsolete above, the texture is thick-chartaceous



and the surface is free from granular punctations. The flowers are white with a sweet odor and the pedicels measure 1.0–2.5 cm. in length. The sepals are suborbicular, 5–6 mm. long and about 5 mm. wide and like the narrowly ovate bracteoles devoid of glandular-denticulations. The petals are about 7 mm. long. The stamens (ca. 20) are about 5 mm. long, the filaments measuring only 1 mm. in length while the anthers are 4 mm. long, linear and taper gradually to the apex. The ovary is conical, 4-celled, each cell having one or two ovules, and tapering into the style which is crowned by an entire stigma slightly exceeding the style in diameter. The fruit is globose, 12–20 mm. in diameter, 4-celled with one or two seeds in each cell, only one of which usually fully matures.

One of the types of this species, as cited by Krug and Urban, is *Père Duss 171* from Martinique. Before me are several specimens of this collection (supposed isotypes, FM, Mo, NY, US) none of which belongs to this species, but to *T. elliptica*. Perhaps there may be some confusion in the label of the Berlin specimen, since all seven sheets of *Duss 171* in American herbaria are true *T. elliptica*. On the label of two specimens in the New York and U. S. National herbaria are two numbers, 171 and 638. There is no difference in the material but *Duss 638* has been cited by Urban under *T. elliptica*. I doubt very much whether *T. oligostemon* actually grows in either Martinique or Guadeloupe, from which it has been cited. Williams cites material from Trinidad (none of which I have seen), and this, with that from Tobago, perhaps gives the correct geographical distribution for the species.

Krug and Urban's description is very complete. They state, however, that the ovary and fruit are 2-celled or incompletely 4-celled and that the number of ovules and seeds in either case are four. All material sectioned by me showed the ovary and fruit to be clearly 4-celled with one or two ovules in each cell. In the first, eight seeds were found, four of which were fully mature while the other four, although immature, were of considerable size. In other cases, a single seed was found in each cell.

The distinguishing characters of *T. oligostemon* are the four-celled ovary and fruit, the eglandular sepals and bracteoles, the entire stigma and the 10–15 pairs of lateral veins of the thick-chartaceous leaves.

The closest species is *T. delicatula* of Trinidad and French Guiana. This latter species can be distinguished by the 3-celled ovary, the tri-crenate stigma, and the thin papery leaves with 7–8 pairs of lateral veins.

30. *Ternstroemia retusifolia*, sp. nov.

Rami et ramuli verticillati, grisei, teretes. Folia crasso-coriacea, apice ramulorum verticillata vel basi ramulorum posita, cuneata, 2.5–3.0 cm. longa et 1.0–1.3 cm. lata, apice rotundata, semper retusa, basi attenuata, margine plana, basi rare revoluta, distincte crenulata, subtus punctata, costa supra canaliculata, subtus plana, saepe subimpressa, petiolis 3–5 mm. longis. Flores non visi. Fructus axillares vel apice ramulorum congesti, solitarii, globosi vel subglobosi, ca. 1 cm. longi et 0.9 cm. diam., 2-loculati, loculis 3-seminibus; pedicellis 1.5–2.0 cm. longis; bracteolis 2 vel 4 (raro 3), binis exterioribus inter se oppositis, minimis ovatis 3–4 mm. longis et ca., 5 mm. latis, margine glanduloso-denticulatis, binis interioribus inter

se oppositis, cum exterioribus alternis, longo-ovatis, 6–7 mm. longis et 3.5–4.0 mm. latis, margine distincte glanduloso-denticulatis; sepalis 5, imbricatis longo-ovatis 9–10 mm. longis et 5.0–6.5 mm. latis, apice acuminatis, margine scariosis integerrimis; petalis (ex corollae fragmento) longo-acuminatis, ca. 6 mm. longis et 2 mm. latis; stylo persistente 5–6 mm. longo; seminibus ca. 5–6 mm. longis.

DISTRIBUTION: Venezuela.

VENEZUELA: Mount Auyantepui (Guayana), *F. Cardona* 243 (TYPE, US), Sept. 1937.

Although described from a fruiting specimen, this species presents several outstanding and unusual delimiting characters. The leaves are thick-coriaceous, cuneate, always retuse at the apex, with a distinct crenulate margin, and are punctate on the lower surface. Two pairs of bracteoles are often found on the fruiting pedicel. The outer pair, which is always present, is the smaller. The inner pair, alternating with the outer, is somewhat sepaloïd and might be interpreted as extra sepals. Occasionally a single bracteole or sepal, according to one's interpretation, is found instead of the inner pair. The sepals are only sparsely glandular-denticulate.

An annotation on the type sheet intimates that *Cardona* 245, collected at the same locality, is the same as this species. This specimen, which has not been examined in this study, is to be found in "Herb. Venezuela" at Caracas.

31. ***Ternstroemia pungens*** Gleason in Bull. Torrey Bot. Club, **58**: 400. 1931.

DISTRIBUTION: Venezuela.

VENEZUELA: Mount Duida: Savanna Hills, dry slopes, alt. 1300 m., *G. H. H. Tate* 837 (TYPE, NY) Aug. 1928 – Apr. 1939 (bush). — Between ridges 23B and 23C, alt. 1850 m., *G. H. H. Tate* 696 (NY, US), Aug. 1928 – Apr. 1939 (large bush; fruit red).

Shrubs with gray, terete, striate branchlets. Leaves coriaceous, obovate to oblong-obovate, up to 5.5 cm. long and 3 cm. wide, rounded and retuse at the apex, cuneate at the base, the margin subentire or finely crenulate especially near the apex, often revolute, upper surface bright green, with impressed midrib and obscure lateral veins, lower surface reddish, profusely black-punctate, the petiole 3–4 mm. long. Fruit borne on long slender recurved pedicels up to 3 cm. long, subglobose, ca. 1 cm. diam., 2-celled, 4–6-seeded, the seeds small, black, ca. 4–5 mm. long, the persistent style 6–7 mm. long, clearly two parted. Fruiting calyx persistent, long-ovate, sharp pointed, involute, 13–15 mm. long, ca. 5 mm. wide at base, the outer lobes glandular-denticulate. The bracteoles appear deciduous or perhaps have been broken off.

The broad obovate leaves, with petioles 3–4 mm. long and profusely black-punctate on the lower surface, are the characters that distinguish this species from *T. tristyla*. On one fruit capsule examined were present a long persistent style, 2-parted as in *T. tristyla*, and fragments of petals showing these two species to be most closely associated.

32. ***Ternstroemia dura*** Gleason in Bull. Torrey Bot. Club, **58**: 401. 1931.

DISTRIBUTION: Venezuela.

VENEZUELA: Mount Duida: Brocchinia Hills, alt. 1350 m., *G. H. H. Tate* 1017 (TYPE, NY), Jan. 4, 1929. — Summit of Peak No. 7, first ridge, alt. 2150 m., *G. H. H. Tate* 656 (NY), Aug. 1928 – April 1929.

Shrub with subverticillate, fissured branchlets. Leaves thick-coriaceous,

elliptic-oblong, up to 3 cm. long, 1.2 cm. wide, obtuse and slightly retuse at apex, tapering at base, the margin revolute, the whole leaf revolute to the midrib and veins invisible, the petiole 1–2 mm. long. Fruit solitary, axillary, the pedicels stout, up to 3 cm. long. Bracteoles 2, opposite, unequal, broadly ovate, 2–3 mm. long, 1.5–2.5 mm. wide, the margin entire with only occasional glandular-denticulations. Calyx-lobes ovate, 8–10 mm. long, 4–5 mm. wide, minutely apiculate, the outer lobes glandular-denticulate along the margin, the inner lobes scarious-margined. Capsule conical-ovoid, ca. 1.5 cm. long, 2-celled, ca. 4-seeded, the seeds light colored, 6–7 mm. long, the persistent style entire, 9 mm. long, the stigma punctiform.

The outstanding characters of this species are the heavy-coriaceous leaves, revolute to the center, the unequal, broadly ovate bracteoles, the minutely apiculate sepals, the 2-celled ovary, the long (9 mm.) style and the punctiform stigma.

33. **Ternstroemia oleaeifolia** Wawra in Martius, Fl. Bras. **12**<sup>1</sup>: 279. 1886. — Melchior in Nat. Pflanzenfam. ed. 2, **21**: 142. 1925.

*Mokofua oleaeifolia* (Wawra) O. Kuntze, Rev. Gen. Pl. **1**: 63. 1891.

*Taonabo oleaeifolia* (Wawra) Szyszylowicz in Nat. Pflanzenfam. III. **6**: 188. 1893.

DISTRIBUTION: Brazil.

No specimens examined.

Branchlets graceful, subverticillate or dichotomous, grayish, many-leaved. Leaves often 3–5-pseudoverticillate, firm, cuneate-oblong or cuneate-obovate, 3–4 cm. long, 0.5–1.0 cm. wide, obtuse or rounded at apex, very short apiculate, attenuate at base, margin recurved, entire or obsoletely crenulate at apex, concolorous or fuscous and sparsely punctate below, veins obsolete, the petiole 5 mm. long. Flowers few, the pedicels 2 cm. or longer, filiform, subcompressed; bracteoles ovate, 5 mm. long, cuspidate-acuminate; calyx-lobes unequal, ca. 1 cm. long, very acute, margin of outer lobes glandular-denticulate, inner lobes erose; petals connate below, connivent, oblong-lanceolate, somewhat longer than the calyx, the margin crisp; stamens uniseriate, not more than 20, half as long as the petals, the filaments very short, compressed, the anthers subsaggitate, somewhat cuspidate; ovary globose, compressed, 2-celled with indications of spurious septa, 2–3 ovules in each cell, the style filiform, strict, over 1 cm. long, the stigma minute, punctiform, under lens bi-lobed.

Although no material was examined, the species presents characters which separate it from closely allied species. These are (1) the subverticillate branchlets with many small, cuneate, 3–5-pseudoverticillate leaves; (2) the compressed, filiform pedicels; (3) the long (1 cm.) very acute, glandular-denticulate sepals; (4) the stamens uni-seriate, about 20 in number, and (5) the long, filiform style (over 1 cm. long), the minute bi-lobed, punctiform, stigma and the 2-celled ovary.

34. **Ternstroemia dentata** (Aublet) Swartz, Prodr. Veg. Ind. Occ. 81. 1788. — Willdenow, Sp. Pl. **2**<sup>3</sup>: 1129. 1799. — Smith in Rees, Cyclop. **35**: No. 5. 1817. — De Candolle in Mém. Soc. Phys. Hist. Nat. Genève, **1**: 410 (Mém. Ternstr. 18). 1822; Prodr. **1**: 524. 1824. — Sprengel, Syst. Veg. **2**: 595. 1825. — Spach, Hist. Nat. Veg. **4**: 62. 1835. — Schomburgk, Fauna Fl. Brit.-Guiana, 1092. 1848. — Choisy in Mém. Soc. Phys. Hist. Nat. Genève, **14**: 106 (Mém. Ternstr. 18). 1855. — Wawra in Martius, Fl. Bras. **12**<sup>1</sup>: 278. 1886. — Melchior in Nat. Pflanzenfam. ed. 2, **21**: 142. 1925.



*Taonabo dentata* Aublet, Pl. Guian. **1**: 569. 1775; **4**: t. 227. 1775. — Szyszyłowicz in Nat. Pflanzenfam. III. **6**: 188. 1893.

*Ternstroemia multiflora* Choisy in Mém. Soc. Phys. Hist. Nat. Genève, **14**: 106 (Mém. Ternstr. 18) 1855.

*Ternstroemia dentata* Swartz var. *α. multiflora* Choisy, loc. cit.

*Ternstroemia dentata* Swartz var. *γ. oblongifolia* Choisy, loc. cit.

*Ternstroemia dentata* Swartz var. *α. opaca* Wawra in Martius, Fl. Bras. **12**<sup>1</sup>: 279. 1886.

*Ternstroemia dentata* Swartz. var. *β. latifolia* Wawra, loc. cit.

*Mokofua dentata* (Aublet) O. Kuntze, Rev. Gen. Pl. **1**: 63. 1891.

DISTRIBUTION: Brazil, French Guiana.

BRAZIL: Prov. Rio Negro, near Barra, *R. Spruce 1045* (ISOTYPE of *Ternstr. dentata* var. *latifolia*, NY; photo FM, G), Dec. 1850 – Mar. 1851. — Prov. Para, near Santarem, *R. Spruce 1083* (NY; photo G), Sept. 1850. — Prov. Rio Negro, near Barra, *R. Spruce 1302* (G, NY; photo FM), May 1851. — Prov. Para, near Santarem, *R. Spruce s.n.* (ISOTYPE of *Ternstr. multiflora*, FM, G), Sept. 1850. — *M. Poeppig s.n.* (ISOTYPE of *Ternstr. dentata* var. *oblongifolia*, fragm. FM), 1834. — Amazonas, Ega, margin of forests, *M. Poeppig 2667* (ISOTYPE of *Ternstr. dentata* var. *oblongifolia*, FM, and ISOTYPE of *Ternstr. dentata* var. *opaca*, FM). — State of Amazonas, Municipality Humayta, near Livramento on Rio Livramento, on terra firma, *B. A. Krukoff 6779* (AA, FM, NY, US), Oct.–Nov. 1934 (tree 70 ft. with rose flowers). — State of Amazonas, Municipality Humayta, on plateau between Rio Livramento and Rio Ipixuma, on campinarana alta, *B. A. Krukoff 7087, 7287* (AA, FM, NY, US), Nov. 1934 (tree 65 ft.). — State of Amazonas, Municipality Manaus, along road to Aleixo, high forest, terra firma, *B. A. Krukoff 8036* (AA, FM, NY), Aug.–Sept. 1936 (low tree or shrub). FRENCH GUIANA: Without definite locality, *Leprieur, s.n.* (fragm. FM).

Trees or shrubs. Leaves coriaceous, obovate to elliptic-obovate, 6–13 cm. long, 2–6(–7) cm. wide, obtusely acuminate at apex, cuneate at base, the margin serrate, 8–12 pairs of veins generally evident on both surfaces, sparsely dark-punctate on the undersurface, the petiole 0.7–1.0 cm. long (2 cm. in *Spruce 1045*). Flowers axillary, usually solitary, occasionally 2-fasciculate. Pedicel 1.5–2.5 cm. long, subterete. Bracteoles 2, unequal, long-triangular, ca. 2 mm. long, sparsely glandular-denticulate. Calyxlobes 5, imbricate, pergamentaceous, 7–8 mm. long, unequal, the outer lobe ca. 5 mm. wide, ovate, glandular-denticulate, the inner lobe ca. 6.5 mm. wide, obovate, the margin scarious. Petals 5, imbricate, pink or rose, oblong-ovate, ca. 8 mm. long, 4 mm. wide, membranaceous, the margin scarious. Stamens bi-seriate, ca. 35, joined their entire length; filaments ca. 1.5 mm. long; anthers long-tapering, unequal, apiculate, 4.0–4.5 mm. long. Ovary conical, two- or four-celled (occasionally incompletely four-celled), four-ovulate, tapering through style (2.5–3.0 mm. long) into a punctiform stigma. Fruit subglobose, ca. 1 cm. diam., two- or four-celled, four-seeded, each seed ca. 7 mm. long.

The most distinctive features of this species are the dentate leaves, the two- or four-celled ovary and fruit, and the long apiculate stamens with apicules nearly 2 mm. long.

Choisy (1855) recognized three varieties, namely var. *multiflora*, var. *oblongifolia* and var. *nudiflora*. Wawra (1886) suggested two new varieties, namely var. *latifolia* and var. *opaca*. Of these, var. *nudiflora* was raised by Urban to specific rank. Varieties *multiflora*, *oblongifolia* and *opaca* present no differences to warrant consideration.

Wawra's var. *latifolia* is indeed a wide-leafed specimen and when he prepared his treatment *Spruce 1045* probably was worthy of distinction. How-

ever, with more ample material available, the larger leaves of *Spruce 1045* (7 cm. wide) are less than a single centimeter wider than the larger leaves of *Krukoff 7287*, which, in turn, has also the smaller leaves typical of the species.

35. ***Ternstroemia brachypoda*** (Wawra), comb. nov.

*Ternstroemia Pavoniana?* Moricand var. *brachypoda* Wawra in Martius, Fl. Bras. **12**<sup>1</sup>: 278. 1886.

DISTRIBUTION: Peru.

PERU: Tatamara, *Lechler 2613* (photo and fragment of TYPE, FM, G).

Branchlets verticillate, angled or striate. Leaves membranaceous or chartaceous, oblong-obovate, 2.5–3.0 cm. long and 1.0–1.5 cm. wide, obtuse and retuse at apex, attenuate at base, the margin denticulate, plane or slightly revolute, the midrib impressed above, elevated below, the veins obscure above, 4–5 pairs elevated below, reticulate, the petiole 3–5 mm. long. Flowers small, solitary with short pedicels; bracteoles ovate, glandular-denticulate; sepals 5, orbicular, glandular-denticulate, hardly exceeding the obovate petals; stamens very small, clavate, the anthers obovoid, muticous, attenuated into slender filaments; ovary 2-celled, each cell 2-seeded; style thick short, the stigma punctiform.

This species was described originally by Wawra as a dubious variety of *T. Pavoniana* Moricand (= *T. quinquepartita* R. & P.). Although only leaf-fragments and a photograph of the type are available for the study of this species, it is clear that it deserves specific status and that the relationship with *T. quinquepartita* is quite superficial. Both have small leaves and flowers. However, in *T. brachypoda* the leaves are more obovate and membranaceous, with veins raised and reticulate on the lower surface, not evident on the upper surface. In *T. quinquepartita* the leaves are more suborbicular and heavy-coriaceous, with the veins deeply etched on the upper surface and raised on the lower surface. The pedicels in *T. quinquepartita* are 2.0–2.5 cm. long, whereas in *T. brachypoda* they are described by Wawra as "brevissime pedunculatis." Detailed descriptive characters and measurements, for the most part, were overlooked by Wawra.

36. ***Ternstroemia laevigata*** Wawra in Martius, Fl. Bras. **12**<sup>1</sup>: 281. 1886. — Melchior in Nat. Pflanzenfam. ed. 2, **21**: 142. 1925.

*Mokofua laevigata* (Wawra) O. Kuntze, Rev. Gen. Pl. **1**: 63. 1891.

DISTRIBUTION: British Guiana.

BRITISH GUIANA: Roraima, *R. Schomburgk 573* (ISOTYPE, FM).

Branches terete, smooth, gray. Leaves coriaceous, oblong-obovate, 5–8 cm. long, 2–3 cm. wide, pale green above, reddish below, veins hardly visible above, both surfaces smooth and free from any punctations, the margin subrevolute, denticulate, the petiole ca. 1 cm. long. Flowers few, the peduncles 1.5–3.0 cm. long; bracteoles acuminate, glandular-denticulate; calyx-lobes subequal, rounded, ca. 5–6 mm. long; glandular-denticulate; petals connate below, shorter than the calyx-lobes, oblong connivent and crisp at the apex; stamens included, 2-seriate, adnate to base of corolla, equalling corolla in length, the filaments very wide, the anthers linear; ovary globose, striate, bi-locular, cells 2-seeded or if 4-celled, one-seeded; style filiform equalling the calyx in length; stigma very minute, punctiform, bisulcate.

Only a leaf-specimen was available for study. The statistics concerning the flower were taken from Wawra's description. Szyszyłowicz treated this species as a synonym of *T. Schomburgkiana*, evidently not taking into consideration the differences in ovary characters and leaf shape and texture.

37. ***Ternstroemia polyandra***, sp. nov.

Arbor parva, ca. 3 m. alta, ramulis griseis teretibus. Folia coriacea, oblongo-obovata vel oblongo-elliptica, 7–12 cm. longa et 3–4 cm. lata, apice obtusa rare rotundata, basi cuneata, subtus brunneo-punctata, margine subrevoluta, denticulata, costa supra canaliculata, subtus elevata, venis (8–10 paribus) secundariisque undique elevatis reticulatisque, petiolis ca. 1 cm. vel plus longis. Flores axillares, solitarii, apice ramulorum congesti, pedicellis teretibus circiter 1.5 cm. longis, bracteolis 2 oppositis late ovato-triangularibus crassis circa 3 mm. longis et 2.5–3.0 mm. latis, margine glanduloso-denticulatis, apice subapiculatis; sepala 5, imbricata, orbicularia vel suborbicularia, 6–7 mm. longa et 6.0–7.5 mm. lata, exterioribus margine glanduloso-denticulatis, interioribus margine scariosis integerrimisque; petala 5, suborbicularia, circiter 6–7 mm. longa et 7–8 mm. lata, emarginata, basi 2 mm. connata; stamina plurima, circiter 300, 4-seriata (ut videtur), 2–4 mm. longa (eodem flore), filamentis gracilibus 1.0–2.5 mm. longis (eodem flore). antheris linearibus 1.0–1.5 mm. longis, connectivo plano, non mutico; ovarium late conicum, circiter 2 mm. longum et 2 mm. diametro, 2-loculatum, loculis 3-ovulatis, stylo parvo 2 mm. longo, stigmatibus punctiformi bi-lobato. Fructus semi-globosus, circiter 1.2 cm. longus et 1 cm. diametro, 2-loculatus, seminibus 4, circiter 5 mm. longis.

DISTRIBUTION: Bolivia.

BOLIVIA: Santa Barbara, alt. 1500 m., *R. S. Williams 1565* (TYPE, NY), Aug. 30, 1902 (8 ft. high, 2 in. diam.). — Same locality, *R. S. Williams 1565A* (NY). — Hacienda Simaco, on the road to Tipuani, alt. 1400 m., *O. Buchtien 5468* (NY, US), Feb. 1920.

As the name signifies, this species is characterized by many stamens, 300 or more, 4-seriate. Also, the oblong-obovate leaves, dark-punctate below and conspicuously veined in both surfaces, are conspicuous characters. *Buchtien 5468* does not show this veining as conspicuously as the type.

Cited here also might be *Bang 2360*. This fruiting specimen agrees in most characters with the type. However, the leaves have a very smooth texture, unusual in the specimens studied, and lack the dark-punctate dots on the lower surface.

38. ***Ternstroemia verticillata*** Klotzsch ex Wawra in Martius, Fl. Bras. 12<sup>1</sup>: 272.

1886. — Melchior in Nat. Pflanzenfam. ed. 2, 21: 142. 1925.

*Ternstroemia verticillata* Klotzsch in Schomburgk, Fauna Fl. Brit.-Guiana, 1092.

1848. — Nomen nudum.

*Mokofua verticillata* (Klotzsch) O. Kuntze, Rev. Gen. Pl. 1: 63. 1891.

*Taonabo verticillata* (Klotzsch) Szyszyłowicz in Nat. Pflanzenfam. III. 6: 188. 1893.

DISTRIBUTION: British Guiana.

BRITISH GUIANA: Along banks of Courantyn River, *R. Schomburgk 1566* (TYPE; photo. G, FM), July-Oct. 1843. — Kaieteur Savannah, in thickets on rocky ground, alt. 360 m., *N. Y. Sandwith 1295* (NY), Sept. 2, 1937 (small tree; flowers sweet-scented, petals yellow, sepals white with deep red center).

Branchlets 5–6-verticillate. Leaves coriaceous, obovate to cuneate-oblong, 2–4 cm. long, 1–2 cm. wide, often 3–5-verticillate, truncate to retuse at apex, pale green, opaque above, fuscous, granular-punctate below, veins



inconspicuous, the margin glandular-crenulate near apex, subsessile or with petiole up to 5 mm. long. Flowers axillary, solitary, the pedicel ca. 1 cm. long, graceful; bracteoles 2, ovate-oblong, 2–3 mm. long, glandular-denticulate; calyx-lobes 5, ovate, submembranaceous, not pergamentaceous, 5–6 mm. long, the margin subscarious yet glandular-denticulate; corolla 7 mm. long, the 5 petals coalesced 5 mm., free portions 2 mm. long, ovate-lanceolate; stamens few, ca. 25, uni-seriate, 4–5 mm. long, the filaments 1–2 mm. long, some filiform, others thick, the anthers linear, acuminate, 2.5–3.0 mm. long; ovary conical, 1.5 mm. diam. at base, tapering into style 4 mm. long, 2-celled, each cell 2-ovulate, sometimes incompletely 4-celled, then each cell 1-ovulate, the stigma punctiform, bi-lobed.

The outstanding characters of this species are: (1) branchlets and sometimes leaves verticillate; (2) leaves truncate or retuse at apex; (3) submembranaceous, colored calyx-lobes which are glandular-denticulate; (4) the corolla coalesced for over two-thirds its entire length; (5) the uni-seriate (25) stamens.

The coalesced corolla separates the species from all others studied. Nearest is *T. globiflora* which is more nearly gamopetalous, having only minute lobes at apex. In *T. verticillata*, the corolla is globose at the base, tapering toward apex where the petals become free.

39. ***Ternstroemia Klugiana*, sp. nov.**

Arbor 8–15 metralis, ramulis teretis verticillatis. Folia coriacea, oblongo-obovata, 6–8 cm. longa, 2.5–3.5 cm. lata, apice obovata, subite acuminata, basi longe attenuata, supra nitida, subtus opaca, costa supra canaliculata apice evanida, subtus prominente elevata, venis 15 vel plus paribus supra haud manifestis, subtus obscuris, margine integerrima, plana vel subrevoluta, petiolis ca. 1 cm. longis. Flores solitarii, pedicellis circiter 9 mm. longis, bracteolis 2 oppositis ovatis circiter 2 mm. longis et 1.0–1.5 mm. latis acuminatis subcarinatis, margine paucissime (1–3) glanduloso-denticulatis; sepala 5, imbricata, 3.5–4.0 mm. longa, exterioribus ovatis circiter 2 mm. latis, apice subacutis, margine paucissime (1–3) glanduloso-denticulatis in sicco revolutis, interioribus late ellipticis vel obovatis, 2.5–3.0 mm. longis, apice obtusis, margine scariosis, non glanduloso-denticulatis; petala 5, membranacea, obtusa, circiter 5.5 mm. longa, 2–3 mm. lata, basi 3 mm. connata; stamina circiter 25, uni-seriata, 3–4 mm. longa, apiculata, filamentis compressis, circiter 0.5 mm. longis, connatis, ad basim corollae adnatis, antheris oblongo-linearibus, circiter 2 mm. longis, apiculis 1 mm. vel plus longis; ovarium conicum, basi 1 mm. vel plus diam., 2-loculatum, loculis uno-ovulatis, stylo 2.5–3.0 mm. longo, stigmatibus punctiformi. Fructus conicus, aureus (fide coll.), circiter 7 mm. longus, basi 6 mm. diam., apice 1 mm. diam. Semina non visa.

DISTRIBUTION: Peru.

PERU: Dept. Loreto, Mishuyacu, in forest near Iquitos, alt. 100 m., *G. Klug* 64 (TYPE, NY), Oct.–Nov. 1929 (tree 8 m. high; flowers white). — Same locality, *G. Klug* 1561 (NY), May–June 1930 (tree 15 m. high; fruit orange).

The outstanding and distinguishing characters of this species are (1) the obovate, coriaceous, abruptly acuminate leaves with 15 or more pairs of obscure, rather straight veins; (2) the short (9 mm.) erect pedicels; (3) the revolute acute outer calyx-lobes (3.5–4.0 mm. long), very sparingly

glandular-denticulate; (4) the petals connate for two-thirds their length; (5) the uni-seriate stamens with apicules longer (1 mm.) than the compressed filaments; (6) the 2-celled ovary and small, punctiform stigma; (7) the distinctly conical fruit.

40. *Ternstroemia carnosa* Cambessèdes in A. St. Hilaire, Fl. Bras. Mer. **1**: 299. 1827. — Walpers, Repert. Bot. Syst. **1**: 369. 1842. — Choisy in Mém. Soc. Phys. Hist. Nat. Genève, **14**: 102 (Mém. Ternstr. 14). 1855. — Wawra in Martius, Fl. Bras. **12**<sup>1</sup>: 276. 1886. — Melchior in Nat. Pflanzenfam. ed. 2, **21**: 142. 1925.

*Ternstroemia carnosa* Cambessèdes var. *acutifolia* Wawra in Martius, Fl. Bras. **12**<sup>1</sup>: 276. 1886.

*Mokofua carnosa* (Cambessèdes) O. Kuntze, Rev. Gen. Pl. **1**: 63. 1891.

*Taonabo carnosa* (Cambessèdes) Szyszylowicz in Nat. Pflanzenfam. III. **6**: 188. 1893.

DISTRIBUTION: Brazil.

BRAZIL: State of Minas Geraës, near Palmita, *A. St. Hilaire s.n.* (TYPE; photo and fragment, FM). — State of São Paulo, in swamps, *Martius s.n.* (TYPE of *T. carnosa* var. *acutifolia*; photo, FM, G). — State of Goyaz, Santa Luzia, Serra do Cipó, stony field, *M. Barreto 4509* (FM), Aug. 17, 1936 (tree 2 m., rare).

According to Wawra, the principal characters of this species are: Leaves coriaceous, 3–6 cm. long, oblong, rounded at apex, rarely shortly acuminate, the margin revolute, entire or obsoletely crenulate, the petiole short, ca. 3 mm. long. Peduncles 1.0–1.5 cm. long, terete, the bracteoles coriaceous, ovate, 4 mm. long, suborbicular, the margin sometimes glandular-denticulate. Sepals 7–10 mm. long, subequal, obovate or suborbicular, the outer lobes glandular-denticulate, the inner lobes entire. Petals exceeding the calyx in length, ovate, joined at the base. Stamens bi-seriate, shorter than the petals, the filaments compressed, very short, the anthers linear, long-mucronate. Ovary globose, 2- or 4-celled, the cells 3–4-ovulate, the style thick, equalling the stamens in length, the stigma punctiform, sub-bi-lobed.

Complete material of this species and *T. cuneifolia* have not been available for this study. I am very dubious of the status of the latter as a species. Wawra, in Martius, Fl. Bras., says that the stigma is punctiform, that the petals exceed the calyx-lobes (7–10 mm. long) in length and that the anthers are long-mucronate.

41. *Ternstroemia asymmetrica* Rusby in Bull. N. Y. Bot. Gard. **4**: 327. 1907.

*Mokofua Lorentzii* Hieronymus ex O. Kuntze, Rev. Gen. Pl. **3**<sup>2</sup>: 17. 1898. Nomen nudum.

*Taonabo flavifolia* Rusby in Bull. N. Y. Bot. Gard. **8**: 104. 1912. Syn. Nov.

DISTRIBUTION: Bolivia.

BOLIVIA: *A. M. Bang 1974* (TYPE, NY). — Songa, *A. M. Bang 837, 838* (FM, G, Mo, NY, US), Nov. 1890. — Atten, alt. 1500 m., *R. S. Williams 1452* (TYPE of *T. flavifolia*, NY), Aug. 17, 1902 (tree 20 ft. high, 6 in. diam.). — Huaynachorisa, alt. 1100 m., *R. S. Williams 1538* (NY, US), July 26, 1902 (tree 25 ft. high). — Buyuyu, *P. Lorentz & G. Hieronymus 869* (FM, NY, photo G). — Dept. La Paz, Prov. Larecaja, Copacabana (about 10 km. s. of Mapiri), alt. 850–950 m., *B. A. Krukoff 11011, 11212* (AA, NY), Oct.–Nov. 1939 (tree 60 ft.)

Tree up to 60 ft. with grayish branches. Leaves coriaceous, oblanceolate to obovate, 3–9 cm. long, 2–3 cm. wide, sometimes inequilateral, slightly blunted or acuminate at the apex, tapering at the base into a petiole, the midrib canaliculate above, prominent below, the veins (10–12 pairs) somewhat prominent above, inconspicuous below, the margin entire or nearly so, the petiole ca. 1 cm. long. Flowers solitary, the pedicels ca. 1 cm. long;

bracteoles 2, opposite, very minute, ovate-triangular, ca. 1 mm. long, apiculate, glandular-denticulate; calyx-lobes orbicular or suborbicular, unequal, concave, pergamentaceous, 4–5 mm. long and 4–5 mm. wide, the outer lobes glandular-denticulate; petals obovate, 7–8 mm. long, 6–7 mm. wide, emarginate at the apex; stamens ca. 40, 5 mm. long, the filaments slender 3 mm. long, joined at base and adnate to base of corolla, the anthers linear, ca. 2 mm. long, the connective hardly muticous; ovary ovate-conical, ca. 2 mm. long and 2 mm. diam. at base, 2-celled, each cell 2–3-ovulate, the style 2.5 mm. long, the stigma punctiform, bi-lobed. Fruit globose, ca. 8–9 mm. diam.; seeds 2 or more, ca. 5–6 mm. long.

In the original description of this species, Rusby concentrates on branchlets and leaves, devoting little consideration to flowers, especially floral measurements and ovary characters, thus handicapping workers who have lacked access to the types. The species is based, so it seems, on the asymmetrical leaves. This character, even in the type, is not very prominent; in fact, some of the specimens cited above hardly exhibit such leaves. Later, Rusby described *T. flavifolia*. I can see no true characters separating this second species from *T. asymmetrica*. It is merely a fruiting specimen of the original species.

The outstanding characters of *T. asymmetrica* are the very small floral and fruiting parts. The calyx-lobes measure not more than 5 mm. in length and the bracteoles are correspondingly small, measuring only a single mm. Both are glandular-denticulate. The ovary is 2-celled and the fruit small, globose and few-seeded.

Other specimens, with slight variations, which perhaps should be cited here are *B. A. Krukoff* 11006 and 11288 collected at Copacabana (about 10 km. south of Mapiro). These two specimens have wider leaves and slightly larger flowers. Number 11288 has been identified with *T. congestiflora*. In fact, many specimens of *Ternstroemia* in Bolivia have been identified with *T. congestiflora* from Colombia. The Colombian species is very distinct, having much heavier coriaceous leaves, obtuse at both extremities, with veins conspicuous on the under surface. Another specimen, *Steinbach* 6057, probably belongs here. This last specimen has smaller leaves which are quite regularly elliptic.

42. *Ternstroemia clusiaefolia* Humboldt, Bonpland & Kunth, Nov. Gen. Sp. 5: 161, t. 463, fig. 1, 1821. — Sprengel, Syst. Veg. 2: 595. 1825. — Choisy in Mém. Soc. Phys. Hist. Nat. Genève, 14: 103 Mém. Ternstr. 15). 1855. — Melchior in Nat. Pflanzenfam. ed. 2, 21: 142. 1925.

*Mokofua clusiaefolia* (H. B. K.) O. Kuntze, Rev. Gen. Pl. 1: 63. 1891.

*Taonabo clusiaefolia* (H. B. K.) Szyszylowicz in Nat. Pflanzenfam. III. 6: 189. 1893.

DISTRIBUTION: Colombia.

COLOMBIA: Dept. Cauca, Popayan, between Hacienda de Meneses and Pasto, alt. ca. 2400 m., *A. Bonpland* 2152 (photo of TYPE, FM). — Dept. Santander, forest on mountains east of Las Vegas, alt. 3000–3300 m., *E. P. Killip & A. C. Smith* 15866 (AA, G, NY, US), Dec. 1926 (tree). — Dept. Santander, forests in vicinity of Charta, alt. 2000–2600 m., *E. P. Killip & A. C. Smith* 18902 (AA, FM, G, NY, US), Feb. 1927 (tree 10–12 ft.; fruit green, lustrous).

Tree 25–35 ft. Branchlets subverticillate. Leaves oblong-obovate, 6–8 cm. long, 3.0–3.5 cm. wide, coriaceous, obtuse at apex, tapering at base,



midrib canaliculate above, prominent below, venation invisible, dark-punctate below, the margin entire, plane, the petiole 0.7–1.0 cm. long. Flowers (*Killip & Smith 15866*) described below. Fruit ovate-subglobose, ca. 10 mm. long and 7 mm. wide, 2-celled, the pedicel ca. 2 cm. long, the calyx-lobes suborbicular, the outer lobes 7 mm. long, 5 mm. wide, the inner lobes 1 cm. long, 7 mm. wide.

Flowers (*Killip & Smith*) axillary, solitary, the pedicels 1.2–1.5 cm. long; bracteoles minute ca. 2 mm. long, somewhat glandular; calyx-lobes suborbicular, 5–6 cm. long, outer lobes fimbriate, occasionally glandular, inner lobes scarious-margined; petals 5, free nearly to base, obovate, ca. 5.5 mm. long and 3.5 mm. wide; stamens bi- or tri-seriate, nearly 100, 3–4 mm. long, the filaments filiform, ca. 1.5 mm. long, joined at the base, the anthers oblong-linear, ca. 2.5 mm. long, subapiculate; ovary minute, 2-celled, few-ovulate, the style 2 mm. long, longer than the ovary, the stigma punctiform, bi-lobed, swelling slightly.

The type of this species, of which only a photograph has been available for this study, is a fruiting specimen. Dr. A. C. Smith compared *Killip & Smith 15866*, a flowering specimen, with the type in Paris and reported that the two matched perfectly. The above description of the flower was drawn from this number.

The margin of the fruiting calyx-lobes in the type is described as membranaceous. In *Killip & Smith 15866*, the calyx-lobes (flowering) are somewhat smaller and the margin is quite membranaceous but also fimbriate with an occasional evidence of glandular-denticulations. The leaves of the two specimens match very well.

43. ***Ternstroemia longipes*** Klotzsch ex Wawra in Martius, Fl. Bras. **12**<sup>1</sup>: 277. 1886.  
— Melchior in Nat. Pflanzenfam. ed. 2, **21**: 142. 1925.

*Ternstroemia longipes* Klotzsch in Schomburgk, Fauna Fl. Brit.-Guiana, 1092. 1848.  
— Nomen nudum.

*Mokofua longipes* (Klotzsch) O. Kuntze, Rev. Gen. Pl. **1**: 63. 1891.

*Taonabo longipes* (Klotzsch) Szyszylowicz in Nat. Pflanzenfam. III. **6**: 189. 1893.

DISTRIBUTION: British Guiana.

BRITISH GUIANA: *R. Schomburgk 1103* (TYPE; photo, FM, G), Dec. 1842.

Originally published by Klotzsch as a nomen nudum, this species was later described by Wawra in Martius, Fl. Bras. Only a photograph of the type was available for study. Except for a few measurements and general observations most of the following data were obtained from Wawra's description. Incidentally, the photo of the type shows only one mature leaf and one flower.

The leaves are described by Wawra as submembranaceous, elliptic, 4–6 cm. long, 1–2 cm. wide, acute at both extremes, the margin undulate, somewhat glandular-crenulate, the veins obscure, the petiole ca. 1 cm. long. The flowers, according to Wawra, are few, solitary, internodal [most unusual, if true]; pedicel slender, ca. 4 cm. long; bracteoles [2] ovate or oblong, 2 mm. long, glandular-denticulate, glandular-apiculate; sepals [5] subequal, 5 mm. long, orbicular, the outer lobes glandular-denticulate; petals broadly obovate, equalling the calyx in length, subentire; stamens bi-seriate, shorter than petals, the filaments (in same flower, unequal) filiform or very short and thick, the anthers linear, subsagittate, laterally dehiscent, subulate, apiculate; ovary ovoid-globose, two-celled, cells bi-

ovulate, the style terete, thick, shorter than the ovary, the stigma deeply bisulcate or divided into two substipitate, orbicular stigmas.

The outstanding characteristics seem to be the elliptic submembranaceous leaves, the internodal flowers, the long pedicel, the laterally dehiscent anthers and the very short style.

44. ***Ternstroemia crassifolia*** Benth in Hooker, London Jour. Bot. **2**: 363. 1843. — Klotzsch in Schomburgk, Fauna Fl. Brit.-Guiana, 1092. 1848. — Choisy in Mém. Soc. Phys. Hist. Nat. Genève, **14**: 106 (Mém. Ternstr. 18). 1855. — Wawra in Martius, Fl. Bras. **12**<sup>1</sup>: 276. 1886. — Melchior in Nat. Pflanzenfam. ed. 2, **21**: 142. 1925.

*Ternstroemia suborbicularis* Klotzsch in Schomburgk, Fauna Fl. Brit.-Guiana, 1092. 1848. — Nomen nudum.

*Ternstroemia crassifolia* Benth var. *suborbicularis* (Klotzsch) Wawra in Martius, Fl. Bras. **12**<sup>1</sup>: 277. 1886.

*Mokofua crassifolia* (Benth) O. Kuntze, Rev. Gen. Pl. **1**: 63. 1891.

*Taonabo crassifolia* (Benth) Szyszylowicz in Nat. Pflanzenfam. III. **6**: 189. 1893.

DISTRIBUTION: British Guiana.

BRITISH GUIANA: Roraima, *R. Schomburgk* 602 (probable ISOTYPE, FM).

Leaves obovate, coriaceous, obtuse to rounded at the apex, cuneate at the base, 4–6 cm. long, 1.5–3.0 cm. wide, the margin subrevolute, lightly denticulate at the apex, the veins, except for midrib, obscure, the petiole 0.8–1.0 cm. long. Flowers axillary, solitary, or few-fasciculate at end of branchlets; pedicel ca. 6 mm. long; bracteoles 2, suborbicular, ca. 1.5 mm. long; calyx-lobes 5, imbricate, suborbicular, small, 2.5–3.5 mm. long, ca. 2.5 mm. wide, outer lobes glandular-denticulate; petals 5, imbricate, joined at base, 4–5 mm. long, rounded at apex; stamens seemingly bi-seriate, ca. 4 mm. long, the filaments and anthers both very narrowly linear and both ca. 2 mm. long, the anthers acuminate at apex; ovary (fide Wawra) 2-celled, each cell 2- or 1-ovulate, the style shorter than the ovary, the stigma discoid, bi-lobed.

The leaves of this species are not as thick as the name would indicate, when all other species are taken into consideration. The closest relative seems to be *T. discoidea* Gleason, which has a 3-celled ovary and a tricrenate stigma. Otherwise, they agree very well. Only a leaf-specimen and fragmentary flowers of the specimen cited above were available for study. The observation that the ovary is 2-celled and the stigma discoid and bi-lobate is based on Wawra's description. Benth, in the original description, failed to mention the ovary, style, stigma or fruit, the description, in fact, being rather general.

45. ***Ternstroemia quinquepartita*** Ruiz & Pavon, Syst. Veg. Flor. Peruv. Chil. 180. 1798. — De Candolle in Mém. Soc. Phys. Hist. Nat. Genève, **1**: 411 (Mém. Ternstr. 19). 1822; Prodr. **1**: 524. 1824.

*Ternstroemia Pavoniana* Moricand in Mém. Soc. Phys. Hist. Nat. Genève, **7**: 258 (Pl. Nouv. D'Amer. 18), t. 13. 1836. — Walpers, Repert. Bot. Syst. **1**: 369. 1842. — Choisy in Mém. Soc. Phys. Hist. Nat. Genève, **14**: 102 (Mém. Ternstr. 14). 1855. — Melchior in Nat. Pflanzenfam, ed. 2, **21**: 142. 1925.

*Taonabo Pavoniana* (Moricand) Szyszylowicz in Nat. Pflanzenfam. III. **6**: 189. 1893.

*Ternstroemia pentapetala* Pavon, in herb. — Moricand (1836) and Choisy (1855) in Synon. — Non Jack, 1820.

DISTRIBUTION: Peru.

PERU: In Andium sylvaticis et frigidis versus Pallao vicum, *J. Pavon s.n.* (TYPE, Madrid; ISOTYPE & photo, FM).—Locality not given, probably same as above, *J. Pavon s.n.* (TYPE of *T. Pavoniana*, Genève; photo & fragment, FM).

Leaves heavy-coriaceous, oblong-obovate, ca. 2.5 cm. long, 1.0–1.2 cm. wide, rounded, emarginate at apex, cuneate at base, 3–4 pairs of veins deeply etched on the upper surface, obscure below, the cross-veins equally impressed above, the margin revolute, obscurely serrulate, the petiole up to 3 mm. long. Flowers axillary, solitary. Pedicels 2.0–2.5 cm. long, the bracteoles 2, opposite, ovate-lanceolate, ca. 3 mm. long, carinate, the margin glandular-denticulate. Calyx-lobes 5, imbricate, suborbicular, 5–6 mm. long, ca. 4 mm. wide, pergamentaceous, concave, the outer lobes glandular-denticulate. Petals 5, imbricate, joined lightly at the base, obovate, ca. 5–6 mm. long, ca. 5 mm. wide. Stamens (fide Moricand) ca. 100, in several series, ca. 3 mm. long, attached to the base of the petals, the filaments slender, 2 mm. long, joined firmly together at the base, the anthers oblong, shortly mucronate, 1 mm. long. Ovary minute, subconical, ca. 1 mm. long, 2-celled, 3–4 ovules in each cell, attached at apex, the style thick, ca. 1.5 mm. long, the stigma peltate. Fruit subglobose-subconical, ca. 1 cm. long, 2-celled, 2-seeded, the seeds ca. 5–6 mm. long.

Outstanding characters are the small, deeply etched heavy-coriaceous leaves, rounded and emarginate at the apex. For a species with leaves so small, the pedicels (2.5 cm.) are unusually long. Fortunately, I have before me the fragmentary isotype and photograph of Pavon's actual type of this species. The original description is useless.

According to Moricand, Pavon sent him a specimen of *T. quinquepartita*, to which the herbarium name "Ternstroemia pentapetala" was applied. Moricand described a new species, *T. Pavoniana*, based on this specimen. In his discussion, Moricand remarks that *T. Pavoniana* might be the same as Pavon's *T. quinquepartita* but that it is impossible to be certain from the simple description of Pavon. Furthermore, the name *T. pentapetala* appended to the specimen means exactly the opposite of *T. quinquepartita*, which, Moricand goes on to say, is a false epithet. He states further that the stamens, though a little more bunched in front of the middle of the petals seem to him to be arranged in continuous series rather than in five distinct phalanges as stated by Pavon.

Just when the specimen was sent by Pavon to Moricand is difficult to determine since 38 years elapsed between the publication of the two species. However, in 1898, Moricand was merely 19 years of age, so one might assume that it was sent surely after the publication of *T. quinquepartita*. It is further possible that Pavon, who died (1835) a year before Moricand's publication may have forgotten the existence of his *T. quinquepartita* and felt that in *T. pentapetala* he had a new species. This latter name, incidentally, was at that time invalidated because there already existed a *T. pentapetala* from Malaya described by Jack in Malay. Misc. 1: pt. 5, 40. 1820.

At any rate, since these names are synonymous, the original binomial, *T. quinquepartita*, must be retained. Choisy (1855) follows the lead of Moricand and accepts Moricand's name, understanding the whole situation;



he did not like Pavon's name! Neither did Szyszylowicz (1893) and Melchior (1925) evidently, since both have continued the name *T. Pavoni-ana*, the former under *Taonabo* and the latter under *Ternstroemia*.

46. *Ternstroemia cuneifolia* Gardner in Hooker, London Jour. Bot. **4**: 100. 1845.  
— Choisy in Mém. Soc. Phys. Hist. Nat. Genève, **14**: 102 (Mém. Ternstr. 14).  
1855. — Wawra in Martius, Fl. Bras. **12**<sup>1</sup>: 276. 1886. — Melchior in Nat.  
Pflanzenfam. ed. 2, **21**: 142, fig. 64. 1925.

*Ternstroemia cuneifolia* var. *glutinosa* Wawra in Martius, Fl. Bras. **12**<sup>1</sup>: 276. 1886.

*Mokofua cuneifolia* (Gardner) O. Kuntze, Rev. Gen. Pl. **1**: 63. 1891.

*Taonabo cuneifolia* (Gardner) Szyszylowicz in Nat. Pflanzenfam. III. **6**: 189. 1893.

DISTRIBUTION: Brazil.

BRAZIL: Near Rio de Janeiro, Organ Mts., open places, alt. 1800 m., *G. Gardner* 5681 (ISOTYPE, NY; fragment, FM) (shrub 2-3 ft.; petals white). — Near Rio de Janeiro, A. Glaziou 8277 (photo of type of *T. cuneifolia* var. *glutinosa*, FM, G). — Precise locality lacking, A. Glaziou 14525 (G).

According to Wawra, the principal characters of this species are: Leaves coriaceous, cuneate-oblong, 3-6 cm. long, rounded or retuse at the apex, the margin obsoletely revolute, distinctly serrulate at apex, the petiole 0.5 cm. long. Peduncles 1.0-1.5 cm. long, the bracteoles ovate, 2 mm. long, rounded at apex. Sepals 4-6 mm. long, orbicular, the outer lobes 4 mm. long, glandular-denticulate, the inner lobes 6 mm. long, entire. Petals orbicular, shorter than calyx-lobes, connivent. Stamens 25, bi-seriate, the filaments flattened, the anthers linear-subsagittate, five times longer than the filaments, very short-apiculate. Ovary 2-3-celled, cells 2-ovulate, the style very short, the stigma peltate, 2-3-lobed.

This species is so closely allied to *T. carnosa* that I am dubious of the specimens cited above and dubious even of its status as a species. Considerable variation may be found in the leaf and flower characters. The peltate stigma, the petals shorter than the sepals, and the very short-apiculate stamens seem to be the outstanding characters for separation. Unfortunately, I have not had complete material of either species for study.

47. *Ternstroemia subserrata* (Rusby) Melchior in Nat. Pflanzenfam. ed. 2, **21**: 142. 1925.

*Taonabo subserrata* Rusby in Bull. N. Y. Bot. Gard. **8**: 104. 1912.

DISTRIBUTION: Bolivia.

BOLIVIA: Cargadira, alt. 2500 m., *R. S. Williams* 1533 (TYPE, NY), July 30, 1902 (stout bush 7 ft. high).

Shrub with short, stout, gray-red, roughened branchlets. Leaves obovate, coriaceous, 4-7 cm. long, 2-3 cm. wide, obtusely acuminate at apex, tapering at base, the midrib canaliculate above, prominent below, the veins inconspicuous above, approximately 10 pairs elevated below with prominent reticulations, also dark-punctate below, the margin distinctly serrate, the petiole ca. 5-6 mm. long. Flowers solitary, abundant, the pedicel ca. 1 cm. long; bracteoles unequal, ovate-triangular, 1.0-1.5 mm. long and wide, glandular-denticulate; calyx-lobes suborbicular, ca. 4 mm. long, 4-5 mm. wide, outer lobes distinctly glandular-denticulate; petals obovate, very narrow at base, flaring toward apex, 6.5 mm. long, ca. 6 mm. wide, deeply emarginate at apex; stamens many, 130<sup>+</sup>, probably 4-seriate, the filaments variable in same flower, 1.0-2.5 mm. long, slender, joined at base, adnate to base of corolla, the anthers linear, ca. 1 mm. long, the connective slightly projected into a submuticous apex; ovary conical, ca. 2 mm. or less long,

ca. 2 mm. diam. at base, 2-celled, 3-ovulate, the style ca. 3 mm. long, the stigma sub-bi-peltate.

This species, like *T. asymmetrica*, is characterized by small floral parts. However, very outstanding are (1) the distinctly serrate leaves, conspicuously veined with obvious reticulations on the lower surface; (2) the many, 4-seriate stamens (130+) and (3) the very short petioles.

48. ***Ternstroemia Killipiana***, sp. nov.

Arbor 6–9 metralis, ramulis teretibus brunneis. Folia coriacea, oblongo-elliptica vel oblongo-obovata, 7–10 cm. longa et 2–3 mm. lata, aureo-viridia, undique opaca, apice acuminata, basi in petiolum attenuata, subtus sparse punctata, margine plana, integerrima vel apice leviter crenulata, costa supra canaliculata, subtus subtiliter elevata vel plana, nervis undique inconspicuis, petiolis 5–10 mm. longis. Flores solitarii, axillares, pedicellis brevibus 5–8 mm. longis, recurvatis; bracteolis 2 suboppositis ovato-triangularibus 2 mm. longis et 1.5–2.0 mm. latis, apiculatis, margine glanduloso-denticulatis; sepala 5, minuta, oblongo-aequilatera, fragilissima, 2–3 mm. longa et 1.5–2.0 mm. lata, apice subtruncata, basi leviter adnata, exterioribus glanduloso-denticulatis; petala minutissima, quam sepala breviora; stamina 2-seriata, ca. 60, inaequalia, 1.5–2.5 mm. longa, filamentis crassis vel gracilibus, 0.3–0.8 mm. longis, basi leviter connatis et ad basim corollae adnatis, antheris linearibus 1.2–1.5 mm. longis, connectivo apiculato vel mutico; ovarium conicum, breve, 1.5 mm. longum, basi 2 mm. diametro, 2-loculatum, loculis 2-ovulatis, stylo brevissimo, ca. 0.8 mm. longo, stigmate subcrenulato. Fructus ignotus.

DISTRIBUTION: Colombia.

COLOMBIA: Dept. Santander, Mesa de los Santos, in dense woods, alt. 1500 m., *E. P. Killip & A. C. Smith 15294* (TYPE, G; NY, US), Dec. 1926 (tree 25–30 ft.).

The very small flowers with short pedicels (5–8 mm. long), the minute calyx-lobes, not over 3 mm. long, and the equilateral truncate petals, even shorter than the calyx-lobes, are some of the more important distinguishing characters of this species. To these might be added the minute style which is less than 1 mm. long, and the tiny 2-celled ovary. The dull yellow-green, oblong-elliptic or near elliptic leaves, plane-margined and entire, are other distinctive characters.

This species is named for Mr. E. P. Killip, one of the collectors of the type specimen and an ardent student of the flora of Colombia.

49. ***Ternstroemia Mutisiana***, sp. nov.

Habitus ignotus. Rami ramulique grisei, verticillati. Folia coriacea, oblanceolata, 6.0–8.5 cm. longa et 1.5–2.5 cm. lata, apice longo-acuminata, basi longo-attenuata, margine plana, integerrima vel subcrenulata, costa supra leviter impressa, subtus subplana, venis invisibilibus, petiolis 5–10 mm. longis. Flores solitarii, pedicellis gracilibus 1.5–2.5 cm. longis; bracteolis 2 oppositis inaequalibus longo-triangularibus 2–3 mm. longis et 1.5–2.0 mm. latis, margine sparse glanduloso-denticulatis; sepala 5, imbricata, pergamentacea, ovata, inaequalia, 6–8 mm. longa et 4–5 mm. lata, exterioribus sparse glanduloso-denticulatis, interioribus margine scariosis; petala 5, ovata, 8–9 mm. longa et 4–6 mm. lata, basi connata; stamina circiter 40, uni-seriata,  $\pm$  4 mm. longa, filamentis crassis quam 1 mm. minus longis, antheris linearibus circiter 3 mm. longis, connectivo obtuse

projecto; ovarium conicum, circiter 1.5 mm. longum, 2-loculatum, loculis 2-3-ovulatis, stylo breve crassoque circiter 1.5 mm. longo et 1 mm. crasso, stigmate subcapitato.

DISTRIBUTION: Colombia.

COLOMBIA: Precise locality lacking, *J. C. Mutis* 2461 (TYPE, US), 3916 (US), 1760-1808.

*Ternstroemia Mutisiana* is characterized by the simplicity of its appearance. The leaves are oblanceolate, tapering long at both extremities, the margin plane and entire, the midrib lightly impressed above, plane below, the veins not visible. The ovary is 2-celled, conical and thick, measuring 1.5 mm. from the base, tapering into a stout style of approximately the same length and nearly  $\frac{2}{3}$  as thick. The stigma is subcapitate.

This species is named in honor of the early Colombian naturalist, José Celestino Mutis.

#### LITTLE KNOWN OR DUBIOUS SPECIES

1. *Ternstroemia cuneata* Poeppig ex Choisy in Mém. Soc. Phys. Hist. Nat. Genève, **14**: 109 (Mém. Ternstr. 21). 1855. Nomen nudum. = ?

This undescribed species is merely recorded by Choisy. He states that the genus is unknown to him.

2. *Ternstroemia rubicunda* Klotzsch in Schomburgk, Fauna Fl. Brit.-Guiana, 1092. 1848. Nomen nudum.

3. *Ternstroemia Ruiziana* Moricand in Mém. Soc. Phys. Genève, **7**: 257, t. 12. 1836. — Walpers, Repert. Bot. Syst. **1**: 368. 1842. — Choisy in Mém. Soc. Phys. Genève, **14**: 106 (Mém. Ternstr. 18). 1855. — Melchior in Nat. Pflanzenfam. ed. 2, **21**: 142. 1925.

*Mokofua Ruiziana* (Moricand) O. Kuntze, Rev. Gen. Pl. **1**: 63. 1891.

Moricand states that this species has angled branches, four bracteoles, a tubular corolla and a velutinous ovary. The leaves are distinctly dentate, sessile, and the veins are conspicuously raised on both surfaces.

There is no doubt in my mind that this species does not belong in the genus *Ternstroemia*. The tubular corolla (mentioned in the description and clearly illustrated) and the velutinous ovary immediately ban it from the genus. Four bracteoles, although unusual, are found in a single species, *T. heptasepala* Krug & Urban, in the West Indies.

A single leaf, taken from the type, was the only material available for my study. Although such a condition is not impossible, I have never seen a sessile-leaved specimen of *Ternstroemia* or one with leaves so conspicuously veined on both surfaces. In the illustration the anther appears much shorter than the filament, a feature not typical in *Ternstroemia*.

The description and illustration, while in a way revealing, are too poor to suggest generic classification.

4. *Ternstroemia voraimae* Klotzsch in Schomburgk, Fauna Fl. Brit.-Guiana, 1092. 1848. Nomen nudum.

5. *Ternstroemia venosa* Sprengel, Neue Entdeck. **2**: 162. 1821; Syst. Veg. **2**: 595. 1825. — De Candolle in Mém. Soc. Phys. Hist. Nat. Genève, **1**: 411 (Mém. Ternstr. 19). 1822. — Choisy in Mém. Soc. Phys. Hist. Nat. Genève, **14**: 108 (Mém. Ternstr. 20). 1855. — Wawra in Martius, Fl. Bras. **12**<sup>1</sup>: 281. 1886.

*Mokofua venosa* (Sprengel) O. Kuntze, Rev. Gen. Pl. **1**: 63. 1891.



The outstanding characters of this little-known species are: 1. Dentate, lanceolate leaves (narrower than *T. dentata*), opaque and obscurely veined above, prominently veined below. 2. Flowers axillary, the peduncles *aggregate*, very short. 3. Calyx-lobes and bracteoles glandular-denticulate. 4. Corolla twice as long as the calyx. 5. Fruit two-celled, eight-seeded.

It is odd that a species so well described should be so little-known. Choisy (1855) and Wawra (1886) both treat it as dubious, the latter suggesting a close relationship with *T. dentata*. The type was collected by *Otto* in Brazil. Later Sprengel (1825) cites a second specimen collected by *Sello*, also from Brazil.

#### EXCLUDED SPECIES

*Ternstroemia Steubelii* Hieronymus in Bot. Jahrb. **21**: 320. 1896 = **Patascويا Steubelii** Urban in Bericht. Deutsch. Bot. Gesell. **14**: 282. 1896.

ARNOLD ARBORETUM,

HARVARD UNIVERSITY.

## NEW AND CRITICAL CHINESE AND INDO-CHINESE MYRSINACEAE<sup>1</sup>

EGBERT H. WALKER

*With two text-figures*

THE following notes contain a few corrections for my Revision of the Eastern Asiatic Myrsinaceae,<sup>2</sup> needed changes in J. Pitard's treatment of this family in Lecomte's *Flore Générale de l'Indo-Chine*,<sup>3</sup> and new species and additional records from the collections of W. T. Tsang made for Lingnan University and the Arnold Arboretum in southern Kwangtung and adjacent Tonkin, Indo-China. Most of the material was kindly lent me by Dr. E. D. Merrill, Director of the Arnold Arboretum, especially valuable being the collection of photographs, fragments, and duplicates of the Indo-Chinese collections named by J. Pitard in the Paris herbarium. In Pitard's treatment localities and collectors are cited, but not collectors' numbers. With the aid of this collection of fragments, the missing numbers have been ascertained in at least most cases, with reasonable certainty. The citation of collectors' numbers in this paper for specimens cited by Pitard must thus be considered as subject to some possibility of error. The abbreviations for the herbaria where cited specimens are deposited are: AA = Arnold Arboretum, G = Gray Herbarium, Mo = Missouri Botanical Garden, NY = New York Botanical Garden, and US = United States National Herbarium.

**Maesa perlarius** (Lour.) Merr. Trans. Amer. Philos. Soc. n. ser. **24**<sup>2</sup>: 298. 1935.

Based on *Dartus perlarius* Lour. The type is not extant.

*Maesa sinensis* A. DC. Ann. Sci. Nat. II, Bot. **16**: 80. 1841. Based on *Gaudichaud* 279 (?) from southern China in the Delessert herbarium (not seen).

*Maesa tonkinensis* Mez, Pflanzenr. **9**(IV. 236): 34. 1902. Based on *Balansa* 1065 and 1066 from Tonkin (not seen).

*Maesa tonkinensis* var. *macrodonta* Pitard, in Lecomte, Fl. Gén. Indo-Ch. **3**: 777. 1930. Based on Bon's collection from Kien-khé, Hanoi, Tonkin (not seen).

*Maesa tonkinensis* var. *Bonii* Pitard, l. c. Based on Bon's collection from Dung-trung, province of Thanh-hoa, Annam. A duplicate has been examined (AA).

*Maesa tonkinensis* var. *annamensis* Pitard, l. c. Based on several collections by Eberhardt from Annam. Duplicates of some of the cited specimens have been examined (AA).

*Maesa tonkinensis* var. *montana* Pitard, l. c. Based on *Jacquet* 632 from the plateau Lang-bian, Annam. A photograph and fragment have been examined (AA).

ADDITIONAL SPECIMENS SEEN: TONKIN: *Clemens* 3157 (US); *Pételot* 2290, 6307 (AA), 2357, 2358, 2359, 2363, 2364, 2373 (AA, US), 2374, 2989, 2990, 2992 (US); *Squires* 108 (NY, US).

<sup>1</sup> Published by permission of the Secretary of the Smithsonian Institution.

<sup>2</sup> E. H. Walker, A Revision of the eastern Asiatic Myrsinaceae. Philip. Jour. Sci. **73**: 1-258. fig. 1-37. 1940.

<sup>3</sup> J. Pitard, Myrsinacées. In H. Lecomte, *Flore Générale de l'Indo-Chine*. **3**: 765-877. 1930.

Repeated attempts to separate into distinct species and varieties the Chinese specimens attributed to this species in my revision have failed. The species seems to be a variable one in respect to indumentum and leaf size, shape, and dentition. Pitard separates *M. perlarius* (Lour.) Merr. (there called *M. sinensis* A. DC.) and *M. tonkinensis* Mez on dentition of the leaves and pubescence of the calyx-tube, and differentiates four varieties of the latter on dentition and leaf size and shape. Because the above cited Pételot specimens show much variation in these respects, sometimes in the various parts of one specimen, it seems more reasonable to consider *M. tonkinensis* with its varieties as merely variations of *M. perlarius*. This same variability in the genus *Maesa* has been met before.

**Ardisia** (§ *Tinus*) **Helferiana** Kurz, Jour. Asiat. Soc. Bengal **42**: 86. 1873. Based on *Helfer* (Kew distribution 3589) from Tenasserim in the Calcutta herbarium. A photograph has been examined (US).

*Ardisia crispipila* Merr. Univ. Calif. Publ. Bot. **13**: 139. 1936. Based on Pételot 1861 collected by Du Pasquier from Tonkin. A fragment and photograph have been examined (AA).

*Ardisia Helferiana* var. *septentrionalis* Pitard, in Lecomte, Fl. Gén. Indo-Ch. **3**: 846. 1930. Based on *Balansa* 1073 from Tonkin. A fragment has been examined (AA).

*Ardisia albiflora* Pitard, op. cit. p. 387. Based on *Eberhardt* 3764 from Tonkin. A photograph and fragment have been examined (AA).

ADDITIONAL SPECIMENS SEEN: TONKIN: Pételot 5968, 6474 (AA, US). COCHINCHINA: Godefroy 808 (AA); L. Pierre 2818 (AA, NY, US); Poilane 673 (AA, US).

The Pierre and Poilane specimens here cited differ in their toothed leaves and more rusty pubescence. However, Kurz described this species as "entire or obsoletely repand-toothed." Color variation in tomentum is not a stable character. Certain differences in the various descriptions of these species lose significance when the specimens are compared.

**Ardisia** (§*Tinus*) **solanacea** Roxb. Pl. Coromand. **1**: 27. pl. 27. 1795; Fl. Ind. **2**: 269. 1824. Originally described from India without mention of specimens.

*Ardisia humilis* Vahl forma *obovata* Mez, sensu Pitard, in Lecomte, Fl. Gén. Indo-Ch. **3**: 848. 1930. Based on 9 specimens from Cambodia and Cochinchina, including the following.

SPECIMENS SEEN: CAMBODIA: Pierre 971 (AA) from Kuang Repoen in Tpong province. COCHINCHINA: dePerry (Pierre 5321) (AA); Talmay (AA); Thorel 335 (AA).

Mez's treatment of *Ardisia humilis* Vahl is greatly confused, as has been pointed out by Merrill.<sup>4</sup> Pitard attributes to Indo-China only forma *obovata* Mez. Among his 9 cited specimens Thorel 335 is also cited by Mez. The above listed specimens, as well as Pitard's description of *A. humilis* forma *obovata* Mez, compare favorably with my concept of *A. solanacea* Roxb., based on only a few specimens from the type locality in Madras, India, and on various other specimens from southern Asia and China.

**Ardisia** (§*Akosmos*) **oxyphylla** Wall. var. **cochinchinensis** Pitard, in Lecomte, Fl. Gén. Indo-Ch. **3**: 851. 1930. Based on Pierre 5319 from Cochinchina. Duplicates have been examined (AA, NY, US).

ADDITIONAL SPECIMENS SEEN: SOUTHERN KWANGTUNG: W. T. Tsang 26710 (AA, US). TONKIN: near the Kwangtung-Kwangsi border, W. T. Tsang 27003, 27487, 29009, 30350 (AA, US).

<sup>4</sup> Lingnan Sci. Jour. **11**: 50. 1932.



All these specimens clearly belong to the same species, but until a critical study of the southern Asiatic material has been made it is impossible to verify the correctness of the association of Pitard's variety with Wallich's species, based on his collection no. 2291 from Penang. The species is attributed by Mez also to the Andaman Islands, Sumatra, and Borneo. Tsang's Kwangtung collection represents an extension of range into China. Pitard places the species in Section *Tinus*, probably assuming that the sepals are imbricate in anthesis. However, the flowers on the Pierre specimen do not have imbricate sepals, although they are broadly ovate. Hence, I have placed it tentatively in Section *Akosmos*. The leaves resemble closely those of *A. depressa* C. B. Clarke, but the sepals are different and the flowers much larger.

***Ardisia* (§*Akosmos*) *depressa*** C. B. Clarke, in Hook. f. Fl. Brit. Ind. **3**: 522. 1882.

Based on a J. D. Hooker and other specimens from India. A photograph of the first has been examined.

?*Ardisia micrantha* Pitard, in Lecomte, Fl. Gén. Indo-Ch. **3**: 817. 1930. Based on *Balansa* 4812 from Tonkin. A photograph has been examined (AA).

?*Ardisia quinqueгона* var. *micranthera* Pitard, in Lecomte, Fl. Gén. Indo-Ch. **3**: 827. 1930. Based on *Poilane* 10229, 10245, and 10927 from "Dent du Tigre, massif de Dong-tri, prov. de Quang-tri," Annam. Duplicates have been examined (AA).

ADDITIONAL SPECIMENS SEEN: TONKIN: *Pételot* 2368, 2370, 6465, 6468 (AA, US).

*Ardisia depressa* belongs in the complex of species of which the variable *A. quinqueгона* Bl. is the most common representative in eastern Asia. According to the interpretation in my revision, *A. depressa* is the western equivalent, varying only in minor respects, as in size of inflorescence, punctuation, prominence of lateral nerves in the leaves, and ribbed fruits. I have seen only a photograph of the type. Pitard has described several species and varieties in this same complex, of which only part can now be referred, and these with some doubt. When more adequate material has been studied there will doubtless be additional changes.

***Ardisia* (§*Akosmos*) *quinqueгона*** Blume, Bijdr. Fl. Nederl. Ind. 689. 1825. Originally described from China without mention of specimens.

*Bladhia pseudoquinqueгона* Masamune, Trans. Nat. Hist. Soc. Formosa **29**: 184-185; 28. 1939. Based on *C. I. Lei 11* in the herbarium of Taihoku Imperial University, collected in Hainan. Duplicates of the type have been examined (AA, NY).

Although this widespread species is highly variable, I see no characters in Masamune's species justifying its recognition.

***Ardisia quinqueгона*** Blume var. *oblonga* Walker, Philip. Jour. Sci. **73**: 77. 1940.

Based on *F. C. How* 71089, from Hainan (examined, US).

SPECIMENS SEEN: *Pételot* 2414 (AA, US), 2416 (US), 2417, 6464 (AA, US), 6470 (AA), the first three from Sontoy province, the others from Thai Nguyen.

This variety, originally described from Hainan, differs from the typical form of the species in its larger, oblong sepals and smaller inflorescences. Most of the additional specimens cited above have about the same characters. In most of them also the typical lepidote scales are more or less modified into pseudohairs, that is, they are raised on minute stalks and are fimbriate, thus resembling minute but coarse branched hairs. This indument covers a larger proportion of the stems. Furthermore, the leaves

are mostly larger. If the interpretation of this variety be thus modified, the collection by Gressitt (no. 1758) from eastern Kwangtung, doubtfully referred to this species in the original treatment, may be admitted, thus giving the variety a decided increase in range. These variations need further study by means of additional material and field observations. The field data accompanying available specimens are quite insufficient. I have searched among the available duplicates and fragments of Pitard's species for material of like nature, but in vain. Certain of his species in this affinity, however, are not adequately represented by available specimens and hence are not thoroughly understood.

***Ardisia quinqueгона*** Blume var. ***hainanensis*** Walker, Philip. Jour. Sci. **73**: 76. 1940. Based on Lingnan University (Canton Christian College) 18098 from Hainan (examined).

SPECIMENS SEEN: TONKIN: near the Kwangtung-Kwangsi border, *Tsang* 27414?, 28993, 29876, 30226 (AA, US). KWANGTUNG: near the Tonkin border, *Tsang* 26500, 26587 (AA, US).

These specimens have the characteristic larger, narrowly triangular sepals, and somewhat smaller inflorescences. They are less distinct, however, than the Hainan specimens on which the variety was based, and tend toward var. *oblonga* Walker.

***Ardisia*** (§*Akosmos*) ***austroasiatica*** Walker, nom. nov.

*Ardisia floribunda* Wall. in Roxb. Fl. Ind. **2**: 272. 1824; Wall. List, no. 2263. 1830 (not *A. floribunda* Roem. & Schult. Syst. Veg. **4**: 804. 1819). Based on *Wallich* 2263, in the Geneva herbarium. A photograph of the duplicate in the Kew herbarium has been examined.

*Ardisia yunnanensis* Mez in part, misapplied by Walker, Philip. Jour. Sci. **73**: 64. 1940.

A shrub or small tree up to 3 m. high, the branchlets, inflorescences and petioles densely ferruginous-lepidote when young; leaves petiolate (up to 1 cm.), the blade chartaceous to coriaceous, narrowly oblong-lanceolate to oblanceolate, acute and narrowly decurrent on petiole at base, rather slenderly acuminate at apex, 12–15 cm. long, 2–4 cm. wide, entire, sometimes with reflexed margin, nearly equally green on both sides, glabrous, obscurely punctate, the glands not black, the midrib prominently raised beneath, the lateral nerves numerous (more than 20 pairs), fine, very inconspicuous, diverging at a wide or nearly right angle, straight or curved-ascending, not forming a distinct marginal nerve; inflorescences lateral, sometimes appearing terminal, more or less ferruginous-lepidote or puberulent, distinctly pyramidal-paniculate, 10–20 cm. long, the peduncle 1–8 cm. long, the pedicels (about 5 mm.) subumbellate on racemose primary branches (1–3 cm. long), the bracts linear, up to 7 mm. long, ciliate, caducous; flowers red or pink, about 4 mm. long; sepals shortly united at base, ovate to elliptic-ovate, acute to subrounded, 1.5–2 mm. long, ciliate or fimbriate, sometimes punctate, lepidote; petals ovate, acute, punctate with small dots mostly near apex, glabrous; stamens  $\frac{2}{3}$  length of petals, the anthers ovate to lanceolate, sharply acute to abruptly mucronate, blackish or obscurely punctate on back; pistil equaling or exceeding petals; fruit unknown.

SPECIMENS SEEN: YUNNAN: *Henry* 11994 (AA, NY). BURMA: *Ward* 496 (AA). NEPAL: *Wallich* 2263 (photo. at AA). INDIA: *Griffith* (Kew distrib. 3575) (G); *Strachey & Winterbottom* 1 (G).

The Henry collection from Yunnan was cited erroneously under *Ardisia yunnanensis* Mez in my revision, p. 64–65. Comparison with the other specimens cited and with a photograph of *Wallich 2263* in the Kew herbarium (designated as the type of *A. floribunda* Wall., but probably a duplicate, the actual type probably being in Geneva) shows clearly that *A. yunnanensis* Mez, based on *Henry 13095*, is not the same as *A. floribunda* Wall., thus adding the latter species to the list of those known from China. For additional notes see the end of the next description.

**Ardisia** (§*Akosmos*) **yunnanensis** Mez, Pflanzenr. **9**(IV. 236): 107. 1902. Based on *Henry 13095* from Yunnan in the Berlin herbarium. Duplicates have been examined (AA, Mo, NY, US).

The following description should replace that given in my revision, p. 64:

A tree up to 10 m. high, the branchlets, inflorescences and petioles ferruginous-lepidote when young; leaves petiolate (up to 1.5 cm.), the blade chartaceous, oblong-lanceolate to oblanceolate, acute at base, acute or acuminate at apex, 12–22 cm. long, 3–4.5 cm. wide, entire, glabrous, obscurely punctate, dull green above, paler brownish and ferruginous-lepidote with prominently raised midrib beneath, the lateral nerves numerous (more than 20 pairs), fine, slightly raised above, more so beneath, diverging at nearly a right angle, straight half-way to margin then curved-ascending, not uniting in a definite marginal nerve, the veinlets obscure, reticulate; inflorescences lateral or subterminal, generally supra-axillary, compound-subumbellate or cymose, ferruginous-lepidote or puberulent, 5–9 cm. long, the peduncle 2.5–4 cm. long, the primary branches scattered, the pedicels about 5 mm. long, the bracts inconspicuous, lanceolate to subulate, 2 mm. long, ciliate; flowers white, about 3 mm. long; sepals united about  $\frac{1}{3}$  their length, triangular-ovate to lanceolate, sharply acute, 1–1.5 mm. long, ciliate, not punctate, lepidote; petals ovate, acute, not punctate, glabrous; stamens nearly equaling petals, the anthers ovate, obtuse or acute, mucronate, not punctate on back; pistil equaling or longer than petals; fruit about 7 mm. in diameter, brownish, not punctate, obscurely longitudinally ribbed.

SPECIMENS SEEN: (See my revision, p. 64–65, exclusive of *Henry 11994*).

*Ardisia yunnanensis* appears in two places on page 51 in my key to species of *Ardisia*. As here revised, the first occurrence, lines 4 and 5, will be *A. floribunda*. These two species may be differentiated as follows:

1. Tree to 10 m.; lateral nerves clearly evident beneath; inflorescence 10–20 cm. long, subumbellate or cymose; fls. white, 3 mm. long; sepals triangular-ovate to lanceolate, acute; petals not punctate; anthers not punctate. . . . . *A. yunnanensis* Mez.
2. Shrub to 3 m.; lateral nerves very inconspicuous beneath; inflorescence 5–10 cm. long, paniculate; fls. red or pink, 4 mm. long; sepals ovate to elliptic-ovate, acute to subrounded; petals punctate; anthers blackish or obscurely punctate. . . . .  
 . . . . . *A. floribunda* Wall.

**Ardisia** (§*Crispardisia*) **crassinervosa** Walker, Philip. Jour. Sci. **72**: 86. 1940. Based on Lingnan University (Canton Christian College) 17423 (examined).

*Ardisia crispa* var. *angusta* (Clarke) Mez, Pflanzenr. **9**(IV. 236): 145. 1902, misapplied (and misspelled *angustata*) by Pitard, in Lecomte, Fl. Gén. Indo-Ch. **3**: 863. 1930.

SPECIMENS SEEN: ANNAM: *Poilane 8624* (AA, NY). *Thorel 849* (AA).

*Poilane 8624* is apparently the specimen referred by Pitard to this variety.



I have compared it with the type at Kew, of *A. crenata* var. *angusta* C. B. Clarke, *Griffith* (Kew distribution 3584), and find it to be quite different. Pitard may have cited *Thorel* 849 under *Ardisia crispa* A. DC., but there are no data on the Arnold Arboretum specimen to identify it with Pitard's citation on p. 863.

**Ardisia** (§*Crispardisia*) **elegans** Andr. Bot. Repos. **10**: pl. 623. 1810. Based on a cultivated specimen in England, originally from the Island of Penang (not seen).

*Ardisia Thorelii* Pitard, in Lecomte, Fl. Gén. Indo-Ch. **3**: 869. 1930. Based on Thorel's unnumbered collection from Paklai, Laos. A fragment has been examined (AA).

ADDITIONAL SPECIMENS SEEN: TONKIN: *Balansa* 1069 (fragment AA); *Fleury* 32132 (fragment AA); *Pételot* 1046 (US, NY), 2219, 6467 (US), 4379 (AA, US).

Nine specimens, including the above cited Balansa, Fleury, and Thorel specimens, were cited with the original description of *A. Thorelii* Pitard. All the specimens here mentioned compare very favorably with the south China material attributed to this species in my revision. *Ardisia patens* var. *tonkinensis* Pitard is certainly very closely related. In my revision *A. patens* Mez is considered as a synonym of *A. maculosa* Mez, which is the western equivalent of *A. elegans* Andr. Further examination of these three species and varieties may show still closer affinity.

**Ardisia** (§*Crispardisia*) **kwangtungensis** Walker sp. nov.

Frutex circa 45 cm. altus caule minutissime puberulo glabrescenti plerumque non ramoso praeter ramulis specialibus floriferis. Folia petiolo anguste alato, 5 mm. longo vel brevior, chartacea vel coriacea, anguste lanceolata vel oblongo-lanceolata, graciliter acuta, basi cuneato-acuta et decurrentia, 7–11 cm. longa, 1–2 cm. lata, integra, margine reflexa, supra obscure viridia et non punctata, subtus brunnescentia et obscure lepidota, glabra, costa subtus elevata, nervis lateralibus principalibus circa 8-jugis, supra non conspicuis subtus non prominulis, praecipue in angulis patulis divergentibus, curvato-adscentibus, in nervo marginale definito terminantibus, nervis intermediis minus conspicuis brevioribus et in nervo marginale non terminantibus, glandulis marginalibus per nervum marginalem dispositis. Inflorescentiae minutissime puberulae, circa 7-florae, simplices, subumbellatae in apicibus uncatis ramulorum specialium lateralium floriferorum 5–11 cm. longorum, prope apicem foliis paucis donatorum, pedicellis circa 1 cm. longis. Flores ignoti. Sepala frugifera ovata vel late ovata, 2 mm. longa, non valde imbricata (sepala etiam florentia forsitan imbricata), non punctata plus minusve minutissime puberula scariosa.

Type in the herbarium of the Arnold Arboretum, collected by *W. T. Tsang*, no. 26628, in a thicket on dry clay soil near Na Leung, Fan Ch'eng District, southern Kwangtung province, China, Aug. 1–10, 1936, on an expedition along the Kwangtung-Tonkin border; duplicate in the United States National Herbarium.

If the sepals in flower are distinctly more imbricate than they are in fruit this species may be considered related to *Ardisia nervosa* Walker. It is distinguished, however, by its narrower leaves with inconspicuous rather than prominent lateral nerves, and puberulent rather than glabrous inflorescences.<sup>5</sup> If the sepals are not imbricate enough to relate it to *A. nervosa*

<sup>5</sup> In the key to the species of *Ardisia* in my Revision of the Eastern Asiatic Myrsinaceae, Philip. Jour. Sci. **73** (1940), this species would come under f<sup>2</sup> on page 54. The above characters will distinguish it at that point from *A. nervosa*.

Walker, it would appear to be related to *A. punctata* Lindl., from which it is plainly distinguished by the narrower leaves and the marginal nerves close to the edge of the leaves rather than at some little distance.<sup>6</sup> Also its inconspicuous marginal glands placed along the marginal nerve, rather

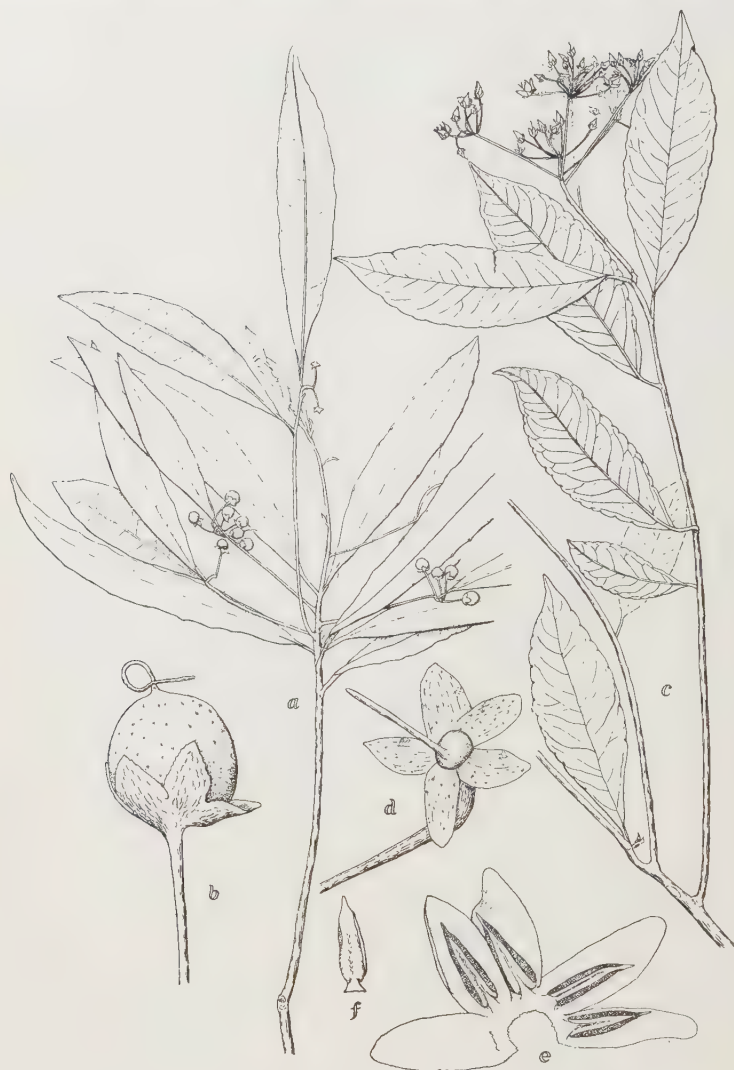


FIG. 1. *a, b. Ardisia kwangtungensis* Walker, drawn from the type: *a.* habit,  $\times \frac{1}{3}$ ; *b.* fruit,  $\times 3$ . *c-f. Ardisia Merrillii* Walker, drawn from the isotype in the U. S. National Herbarium: *c.* habit,  $\times \frac{1}{3}$ ; *d.* calyx and pistil,  $\times 3$ ; *e.* corolla with stamens,  $\times 3$ ; *f.* stamen, back view,  $\times 3$ .

<sup>6</sup> In the key to *Ardisia* in my revision (see preceding footnote) this species would come to the 7th line on p. 55. The above characters will distinguish it at that point from *A. punctata*.

than on the edge of the leaf, are distinctive. This feature, however, might not appear to be so characteristic in other specimens.

**Ardisia** (§*Crispardisia*) **Merrillii** Walker sp. nov.

Frutex 2 m. altus, caule erecto viridi fortasse non ramoso praeter ramulis specialibus floriferis. Folia petiolo 5–8 mm. longo, chartacea vel coriacea, elliptico-lanceolata, acuta vel acuminata, basi acuta, 7–10 cm. longa, 2–3.5 cm. lata, integra sed glandulis marginalibus numerosis intrusis, glabra, subtus vix pallidiora et minutissime lepidota, costa subtus elevata, nervis lateralibus 13–15-jugis crassis prominenter elevatis in nervo marginale non terminantibus venulis utrinque elevatis reticulata. Inflorescentiae minutissime puberulae, duplicato corymbosae, in apicibus ramulorum specialium lateralium floriferorum 11–30 cm. longorum foliis per plus quam superiorem trientem instructorum, axibus primariis 2.5–5 cm. longis, umbellis usque ad 8-floribus terminantibus, pedicellis 5–13 mm. longis. Flores 6 mm. longi, albi, odorati, sepalis tenuibus non valde imbricatis, ovatis vel oblongo-ovatis obtusis vel rotundatis, 2.5–3 mm. longis, non punctatis, dorso glabris obscure venosis, intus rubro-lepidotis vel subtiliter rubro-lineolatis, petalis albis, ovatis, obtusis vel rotundatis, 6 mm. longis, non punctatis, staminibus quam petalis dimidio brevioribus, antheris lanceolatis longe acutis apiculatis dorso non punctatis pistillo petalis subaequilongo. Fructus ignotus.

Type in the herbarium of the Arnold Arboretum, collected by *W. T. Tsang*, no. 28985, in a thicket on dry sandy soil near Chan Uk village near Chuk-phai, Ha-coi Tonkin, Indo-China, May 3–10, 1939, on the third Indo-Chinese expedition of Lingnan University; duplicate in the United States National Herbarium.

This species seems nearest related to *Ardisia nervosa* Walker, known only from Hainan, from which it differs in its thicker lateral nerves not uniting in a definite marginal nerve, its nonpunctate flowers with smaller and thinner sepals not veined within. It resembles *A. conspersa* Walker and related species in its inflorescences and in its special flowering branches with leaves on more than the upper third, but is distinct in its characteristic prominent leaf-venation.

**Ardisia** (§*Crispardisia*) **pedalis** Walker, sp. nov.

Suffrutex vix 30 cm. altus, caulibus erectis e rhizomate, minutissime puberulis, glabrescentibus. Folia petiolo ca. 5 mm. longo, coriacea, elliptico-lanceolata, longe acuminata, basi gradatim acuta, 6–10 cm. longa, 14–33 mm. lata, integra sed glandulis marginalibus intrusis, atro-punctata praecipue subtus, supra glabra, subtus minutissime puberula, praecipue costa elevata, nervis lateralibus non conspicuis, circa 9-jugis in nervo marginale non terminantibus. Inflorescentiae minutissime puberulae, simplices, subumbellatae, in apicibus uncatis ramulorum specialium floriferorum supra-axillarium 2–4 cm. longorum, praecipue prope apicem foliis reductis paucis instructorum, pedicellis 7–12 mm. longis. Flores 6 mm. longi albi odorati, sepalis non valde imbricatis, ovatis, acutis, 2 mm. longis, atro-punctatis puberulis, petalis ovatis vel oblongo-ovatis obtusis, 6 mm. longis, conspicue atro-punctatis extra glabris, staminibus quam petalis  $\frac{1}{3}$ – $\frac{1}{4}$  brevioribus, antheris lanceolatis acuminatis apiculatis dorso leviter atro-punctatis, pistillo petalis subaequilongo. Fructus circa 5 mm. diametro, punctatus.

Type in the herbarium of the Arnold Arboretum, collected by *W. T. Tsang*, no. 29228, in a thicket on dry sandy soil near Chan Uk village near Chuk-phai, Ha-coi,



Tonkin, Indo-China, June 10-12, 1939, on the third Indo-Chinese expedition of Lingnan University; duplicate in the United States National Herbarium. An additional specimen is *W. T. Tsang* 27321 from a similar habitat on Taai Wong Mo Shan near the same village, collected Nov. 18 - Dec. 2, 1936.

This species perhaps resembles most closely *Ardisia affinis* Hemsl., but differs in its larger, slender, long-acuminate leaves and in its strongly punctate and larger flowers. Its small size, from which is derived its specific name, and its prominent rhizome may, of course, be more characteristic of the one known collection rather than of the species. Rhizomes are probably



FIG. 2. *a, b. Ardisia Tsangii* Walker, drawn from the type: *a.* habit,  $\times \frac{1}{3}$ ; *b.* fruit with adherent calyx,  $\times 3$ . *c, d. Ardisia pedalis* Walker, drawn from the type: *c.* habit,  $\times \frac{1}{3}$ ; *d.* flower,  $\times 3$ .

more characteristic of all species of *Ardisia* than seems to be the case, because they are so seldom collected except with the smaller species. The short, slender, special flowering branches, with or without leaves, and the abundantly punctate flowers without prominently punctate anthers are also characteristic.

**Ardisia** (§*Crispardisia*) **Tsangii** Walker, sp. nov.

Frutex fortasse non plus quam 1 m. altus, caule erecto minutissime puberulo glabrescenti, plerumque non ramoso praeter ramulis specialibus floriferis. Folia petiolo 2–5 mm. longo, chartacea, elliptico-lanceolata, longe acuta vel aliquantulum acuminata, basi cuneata, 9–12 cm. longa, 2–3.5 cm. lata, integra, margine reflexa, glandulis marginalibus obscurissimis, glabra, supra dilute viridia, subtus nonnihil pallidiora et nonnumquam lepidota, atro-punctata, costa subtus elevata, nervis lateralibus principalibus 12–15-jugis, elevatis in nervo marginale aequaliter prominulo terminantibus, nervis intermediis minus conspicuis brevioribus et in nervo marginale non terminantibus, venulis elevatis reticulatis. Inflorescentiae minutissime puberulae, simplices, subumbellatae in apicibus uncatis ramulorum specialium lateralium floriferorum 5–8 cm. longorum prope apicem foliis paucis instructorum pedicellis 1–1.5 cm. longis. Flores ignoti, sepala frugifera late ovata obtusa ad rotundata, 2–2.5 mm. longa, florentia fortasse imbricata, punctata, lepidota, ciliolata. Fructus globosus circa 6 mm. diametro (maturitate?), rubescens, valde atro-punctata.

Type in the herbarium of the Arnold Arboretum, collected by *W. T. Tsang*, no. 30707, on Ho Yung Shan, Tien-yen, Tonkin, Indo-China, near the Kwangtung-Kwangsi-Tonkin border, Oct. 13 – Nov. 22, 1940, on an expedition by Lingnan University; duplicate in the United States National Herbarium.

Because of the very obscure marginal glands, this species might seem to belong in Section *Tinus*. However, its subumbellate inflorescences on special lateral leaf-bearing flowering branches are characteristic of Section *Crispardisia*. Its very broad sepals relate it to *A. crassinervosa* Walker and to *A. nervosa* Walker. From the former it is distinguished by its larger and less prominently veined leaves, and from the latter by the absence of nerves on the inside of the smaller sepals.

**Ardisia** (§*Crispardisia*) **villosoides** Walker, Philip. Jour. Sci. **72**: 93. 1940. Based on *F. C. How* 72747 from Hainan (examined [US]).

ADDITIONAL SPECIMEN SEEN: TONKIN: *Pételot* 2418 (AA, US) border of stream in an open moist forest, Tu Phap, Province of Sontoy, June 15, 1940.

This species was previously known only from the type locality.

**Ardisia** (§*Crispardisia*) **virens** Kurz, For. Fl. Burma **2**: 575. 1877; Jour. Asiat. Soc. Bengal **46**<sup>2</sup>: 226. 1877. Based on a collection by *J. Anderson* from Burma (not seen).

*Ardisia stellifera* Pitard, in Lecomte, Fl. Gén. Indo-Ch. **3**: 863. 1930. Based on *Eberhardt* 3082 from Annam. A fragment has been examined (AA).

*Ardisia evonymifolia* Pitard, op. cit. p. 865. Based on *Poilane* 2259 and *Spire* 372 from Laos. Fragments have been examined (AA).

*Ardisia tonkinensis* A. DC. Rep. Sp. Nov. **8**: 354. 1910. Based on *Bon* 2912 from Tonkin. A duplicate has been examined (AA).

*Ardisia virens* var. *annamensis* Pitard, in Lecomte, Fl. Gén. Indo-Ch. **3**: 868. 1930. Based on *Poilane* 10370 from Annam. A duplicate has been examined.

ADDITIONAL SPECIMENS SEEN: TONKIN: *Pételot* 2407, 2466<sup>7</sup> (AA), 4292, 4297, 4300, 6466<sup>7</sup> (US), 6482 (AA, US).

The interpretation of this species in my revision recognized considerable variation, with only a suggestion of any coordination with geographic distribution (see p. 84). Several of Mez's species were placed as synonyms, and reference was made to Pitard's related species. Further comparison of fragments and duplicates of his specimens with the Chinese and Formosan material and with a photograph received from Calcutta of *Griffiths* (Kew Distrib. 3561), cited by both Mez and Clarke,<sup>8</sup> only strengthens my belief that this is a very variable species and not subject to subdivision, at least until much more material can be assembled. There is much variation in size and shape of leaf and of sepals. In comparing the descriptions item by item the apparent variations seem to be further confused by variant uses of words. The possession of specimens from Sumatra and Siam, which seem to belong in this variable population, further emphasizes the need to postpone subdivision, if indulged in at all.

***Ardisia* (§*Bladhia*) *gigantifolia*** Stapf, Kew Bull. 1906: 74. 1906. Based on a specimen in the Kew herbarium grown by J. Veitch & Sons in England in 1901 from seed sent from "South China" by E. H. Wilson. A photograph has been examined.

*Ardisia kteniophylla* A. DC. Rep. Sp. Nov. 8: 354. 1910. Based on *Bon* 3158 from Tonkin (not seen).

SPECIMENS SEEN: TONKIN: *Pételot* 6469 (AA, US); *W. T. Tsang* 29012 (AA, US).

Although the type of DeCandolle's species has not been seen, a fragment (AA) from the type in Paris of *A. kteniophylla* var. *microdonta* Pitard, *Poilane* 3097, has been examined. The only significant difference in the descriptions of *A. gigantifolia* Stapf and *A. kteniophylla* A. DC. seems to be in the smaller number of lateral nerves of the latter. Although Pitard's variety seems to be indistinguishable from the species, there is as yet insufficient material on which to base a reduction.

***Embelia* (§*Heterembelia*) *oblongifolia*** Hemsl. Jour. Linn. Soc. Bot. 26: 62. 1889. Based on *Ford* [90] from Kwangtung. A photograph has been examined.

SPECIMENS SEEN: TONKIN: near the Kwangtung border, *W. T. Tsang* 29567 (AA, US).

This species has not been previously reported from Indo-China.

***Embelia* (§*Micrembelia*) *polypodioides*** Hemsl. & Mez, Notizbl. Bot. Gart. Berlin 3: 108. 1901. Based on *Henry* 10060A from Yunnan. A duplicate has been examined (AA).

SPECIMEN SEEN: TONKIN: *Pételot* 1790 (US).

This species has not previously been recorded from Indo-China.

***Myrsine stolonifera*** (Koidz.) Walker, comb. nov.

*Myrsine marginata* Mez, in Pflanzenr. 9(IV. 236): 339. 1902 (not *M. marginata* Hook. & Arn. 1834). Based on *Faber* 96 and 657 from Chekiang. Duplicates have been examined.

<sup>7</sup> This specimen bears exactly the same data as no. 6466 in the U. S. National Herbarium and appears to be the same collection, but the discrepancy in collector's numbers is unmistakable.

<sup>8</sup> In Hook. f. Fl. Brit. Ind. 3: 524. 1882.



*Anantia stolonifera* Koidz. Bot. Mag. Tokyo **37**: 40. 1923. Based on a collection by Koidzumi, Sept. 1912 from Prov. Yamato, Japan (not seen).

The name *Myrsine marginata* Mez, used in my revision through oversight, is untenable because of *M. marginata* Hook. & Arn. Jour. Bot. Hook. **1**: 283. 1834, which Mez recognized as a synonym of *Chrysophyllum marginatum* Radlk. The next oldest name is *Anantia stolonifera* Koidz. This is unfortunate because, if this plant bears stolons, probably only those who know the growing plant have seen them. G. Masamune in 1931<sup>9</sup> proposed *Anantia Mezii* to replace *Myrsine marginata* Mez, but the reason for not using the name *Anantia marginata* published by the same author in 1929<sup>10</sup> was not given.

**Rapanea neriifolia** (Sieb. & Zucc.) Mez, Pflanzenr. **9**(IV. 236): 361. 1902. Based on *Myrsine neriifolia* Sieb. & Zucc. Possible duplicates of the type have been examined.

*Rapanea capitellata* var. *microcarpa* Pitard, in Lecomte, Fl. Gén. Indo-Ch. **3**: 788. 1930. Based on two collections by Poilane. Duplicates of the first, no. 5968, have been examined (AA, NY).

ADDITIONAL SPECIMENS SEEN: SOUTHERN KWANGTUNG: *W. T. Tsang* 26574, 26744 (AA, US). TONKIN: near the Kwangtung-Kwangsi border, *W. T. Tsang* 27501, 29037, 29936, 30200 (AA, US).

Pitard lists two varieties of *Rapanea capitellata* (Wall.) Mez and *R. cochinchinensis* Mez as occurring in Indo-China. It seems advisable, however, to consider *R. capitellata* var. *microcarpa* Pitard as a synonym of the common southern China species, at least until a thorough study can be made of all the southern Asiatic species of this genus. Merrill<sup>11</sup> has also recorded *R. linearis* (Lour.) S. Moore for Indo-China.

**Rapanea neriifolia** var. **yunnanensis** (Mez) Walker, Bull. Fan. Mem. Inst. Biol. Bot. Ser. **9**: 189. 1939. Based on *Rapanea yunnanensis* Mez. Duplicates of the type, *Henry* 11570, *B*, and *C*, have been examined.

*Rapanea capitellata* var. *macrocarpa* Pitard, in Lecomte, Fl. Gén. Indo-Ch. **3**: 787. 1930. Based on *Poilane* 6916 from Annam. A duplicate has been examined (AA).

ADDITIONAL SPECIMENS SEEN: TONKIN: near the Kwangtung-Kwangsi border, *W. T. Tsang* 27197 (AA, US); *Pételot* 6232 (AA, US).

Merrill<sup>12</sup> has already reported this variety from Indo-China, based on *Pételot* 7950 from Tonkin, although as *Rapanea yunnanensis* Mez. That specimen, however, is less characteristic of this variety than is *Pételot* 6232.

U. S. NATIONAL HERBARIUM,  
WASHINGTON, D. C.

<sup>9</sup> Jour. Soc. Trop. Agr. **3**: 22. 1931.

<sup>10</sup> G. Masamune, A preliminary report on the vegetation of the island of Yakusima. 107. 1929.

<sup>11</sup> E. D. Merrill, A commentary on Loureiro's "Flora Cochinchinensis." Trans. Amer. Philos. Soc. n. ser. **24**<sup>2</sup>: 300. 1935.

<sup>12</sup> Jour. Arnold Arb. **19**: 61. 1938.

DEGENERIACEAE, A NEW FAMILY OF FLOWERING PLANTS  
FROM FIJI

I. W. BAILEY AND A. C. SMITH

*With five plates*

IN 1934 the junior author collected specimens of a fruiting tree on the Fijian island of Vanua Levu, but efforts to place the plant in a family failed. Neither fruit nor foliage suggested any plant previously known from the Pacific. Although wood from the trunk was available, no definite suggestion of a family could be made by those who examined the specimen. Recently, a re-examination of the wood and a study of the internal structure of the twigs and leaves indicated that the plant is related to the Magnoliaceae, and it has subsequently been ascertained that the plant is conspecific with a tree collected in flowering condition in the interior of Viti Levu by Mr. Otto Degener in 1941.

This Fijian plant, which is now represented by ample foliage, flowers, fruits, and wood, is definitely a member of the ranalian complex. It exhibits close similarities to the Magnoliaceae, particularly in the internal structure of its vegetative organs, in its pollen, and in the vascularization of its stamens. However, we cannot place it in the Magnoliaceae, for reasons to be discussed on succeeding pages, without expanding the current concept of that family to an unwarranted degree and certainly far beyond the limits proposed by Dandy (in Kew Bull. **1927**: 257-264. 1927) and Hutchinson (Fam. Fl. Pl. Dicot. 81. 1926). Another comparatively close relative of the new plant is the genus *Himantandra* F. v. Muell.,<sup>1</sup> originally believed to be a member of the Annonaceae, but since — and we believe correctly — established as representing the unigeneric family Himantandraceae (Diels in Bot. Jahrb. **55**: 126. 1917).

These three families, Magnoliaceae (sensu stricto),<sup>2</sup> Himantandraceae, and the proposed Degeneriaceae, form a group with salient morphological similarities. They are differentiated from more remotely related families such as the Eupomatiaceae, Annonaceae, Winteraceae, Trochodendraceae, etc. by fundamentally significant differences which we shall consider in future detailed treatments of these groups. For the purposes of the present paper, the relationships of the new plant need not be considered beyond the Magnoliaceae, Himantandraceae, and Winteraceae. Following the

<sup>1</sup> The use of the name *Himantandra* F. v. Muell. rather than *Galbulimima* F. M. Bailey is discussed in detail in the following article in this Journal.

<sup>2</sup> Whenever mentioned in the following pages, the family Magnoliaceae is intended in the restricted sense, as interpreted by Dandy, Hutchinson, and many other recent students.

technical description of the new genus and species, we shall discuss the salient internal morphological features of the plant. The remarkable stamens and carpel of *Degeneria* deserve special consideration, since they are likely to prove of some significance in future discussions of the floral morphology of the angiosperms.

It is a privilege to associate the name of the new plant with that of Mr. Otto Degener, collector of the type specimen and author of *Flora Hawaiianensis* and numerous other works on Pacific botany. We are indebted to Dr. J. Hutchinson, of the Royal Botanic Gardens, Kew, for his kindness in sending us floral material of *Himantandra*, and to Dr. A. O. Dahl for verifying our interpretation of the pollen morphology of *Degeneria*. Figures 1–11 were drawn by Mr. Gordon W. Dillon and figures 12–14 by Dr. Charlotte G. Nast. We are further indebted to Dr. Nast for the preparation of serial sections of the vegetative and floral organs of our plant.

### **Degeneriaceae** fam. nov.

Familia characteribus generis unici.

### **Degeneria** gen. nov.

Arbor, stipulis nullis, foliis alternatis simplicibus pinnatinerviis. Flores solitarii supra-axillares hermaphroditi. Sepala et petala disparia, calyce rotato, sepalis quam petalis multo minoribus, petalis pluriseriatis carnosis imbricatis, toro coriaceo subgloboso vel convexo, centro sub ovario depresso. Stamina hypogyna plura carnosia complanata, loculis 4 binis parallelis extrorsis immersis rimis 2 longitudinalibus dehiscentibus. Staminodia intra stamina et quam stamina pauciores, textura similia. Carpellum unicum inaequilateraliter ellipsoideum, partibus ventralibus approximatis diffuse stigmatiferis, loculo unico, ovulis numerosis biseriatis, placentis 2 sutura ventrali parallelis. Fructus indehiscens, seminibus numerosis biseriatis, alteris sessilibus, alteris funiculo filiformi suspensis.

### **Degeneria vitiensis** sp. nov.

Arbor ubique glabra, ramulis subrectis teretibus crassis (apicem versus 3–8 mm. diametro) fusco-nigrescentibus rugulosis saepe fistulosis; petiolis gracilibus (1.5–3 mm. diametro) rugulosis supra canaliculatis 2–6.5 cm. longis basi incrassatis; laminis chartaceis vel subcoriaceis siccitate utrinque fuscis ellipticis vel obovato-ellipticis, 9–27 cm. longis, 3.5–13.5 cm. latis, basi gradatim angustatis et in petiolum decurrentibus, apice rotundatis vel leviter emarginatis, margine integris et leviter revolutis, supra subnitidis, costa supra subplana vel interdum leviter canaliculata subtus prominente et rugulosa, nervis secundariis utrinsecus 10–18 cum aliis debilioribus interspersis divergentibus marginem versus anastomosantibus et rete venularum intricato utrinque conspicue prominulis; pedicellis sub anthesi 2–3 cm. longis gracilibus nigrescentibus rugulosis apicem versus gradatim incrassatis, bracteis 2 vel 3 coriaceas ovatas obtusas 1–1.5 mm. longas gerentibus vel cicatricibus ornatis; calyce coriaceo sub anthesi 8–9 mm. diametro profunde lobato, sepalis 3 ovato-deltoides 3.5–5 mm. longis et latis ubique obscure luteo-glandulosis, apice obtusis, margine anguste scariosis subintegris (vel obscure erosulis) inconspicue ciliatis (pilis circiter 0.15 mm. longis); petalis 12 vel 13 ut videtur 3–4-seriatis concavis apicem versus plus



minusve cohaerentibus, elliptico-oblongis (vel interioribus obovatis), apice et basi rotundatis, ubique obscure luteo-glandulosis, margine pilis simplicibus ad 0.6 mm. longis decidue ciliatis, exterioribus maximis 18–19 mm. longis et 10–12 mm. latis, interioribus crassissimis et minimis circiter 12 mm. longis et 6 mm. latis; staminibus circiter 20 congestis plus minusve 3-seriatis oblongis vel obovato-oblongis, 4.5–6 mm. longis, 1.5–2.5 mm. latis (interioribus angustissimis), apice rotundatis vel subtruncatis et ibi ut petalis ciliatis, obscure luteo-glandulosis, loculis 2–3.5 mm. longis; staminodiis 11 vel 12 spathulato-oblongis, circiter 6 mm. longis et apicem versus 1.5–2.5 mm. latis, apice rotundatis et conspicue introrse cucullatis; carpello sub anthesi circiter 5.5 mm. longo, 3 mm. lato, et 2 mm. crasso, basi obtuso, apice subrotundato, marginibus stigmatiferis 3–4 mm. longis undulatis, ovario crasse carnosio luteo-glanduloso, loculo lineari-oblongo circiter 4 mm. longo parti ventrali oblique parallelo, ovulis 24 vel 26 oblongis sub anthesi circiter 0.5 mm. longis utrinque rotundatis; pedicellis sub fructu crassis (2–3 mm. diametro) ad 4 cm. longis, cicatricibus persistentibus infra medium, sepalis persistentibus; fructibus oblongo-ellipsoideis maturitate ad 5 cm. longis et 3 cm. latis et crassis, leviter inaequilateralibus, dorso basim versus affixis, ventre stigmatum carina ornatis, pericarpio coriaceo demum ad 2 mm. crasso; endocarpio inter semina carinato et appendiculas ceriferas irregulariter lobatas 2–3 mm. longas basi seminum vel funiculorum subpersistentes saepe gerente; seminibus obovoideis, 8–11 mm. longis, 5–8 mm. latis, valde complanatis, grosse scrobiculatis, basi obtusis vel breviter stipitatis, apice rotundatis.

FIJI. VITI LEVU: Tholo North: Nauwanga, vicinity of Nandarivatu, alt. 750 m., *Degener 14537* (TYPE, Arn. Arb.), Feb. 24, 1941 (tree, in forest). VANUA LEVU: Mbu a: Lower Wainunu River valley, alt. 0–200 m., *Smith 1754* (Gray Herb., N. Y. Bot. Gard., etc.), May 7, 1934 (tree 14 m. high, in open forest; native name: *yarangele*).

The type collection bears flowers and a single detached immature fruit, while *Smith 1754* bears mature fruits. In foliage the two specimens show slight differences, which appear to us of an individual nature.

STEM. In *Degeneria* the primary vascular cylinder is a much dissected dictyostele, being composed of numerous discrete bundles that are separated by conspicuous gaps. Each bundle is capped externally by slender thick-walled fibers and is subtended internally by slender, vertically elongated strands of parenchyma. The bulk of the pith is composed of large, relatively thin-walled medullary cells, but transversely oriented plates or diaphragms of stone cells are formed, particularly at the nodal and subnodal levels of the stem. Large spherical oil cells and irregular, often branched sclereids are conspicuous features of the cortex.

In the secondary xylem of the young stem, narrow multiseriate rays extend outward from the gaps in the dictyostele. These rays flare outward through the secondary phloem (*fig. 24*), which is stratified into alternating strands of hard and soft bast. The thin-walled, angular vessels (*fig. 25*) of the secondary xylem occur singly or in small, usually radially oriented clusters. The vessel-members have numerous scalariform perforations and the pitting between vessels, and between vessels and parenchymatous elements, is typically scalariform. The thin-walled imperforate tracheary cells have

pits with minute borders. The parenchyma distribution is dominantly banded apotracheal with a low percentage of scanty paratracheal. The multiseriate rays in the later-formed secondary xylem (*fig. 26*) are of typically fusiform outline as seen in tangential longitudinal sections. The infrequently occurring uniseriate rays are low and are composed of upright cells, such as are present on the margins of the multiseriate rays. Oil cells are of sporadic occurrence in the rays of the secondary xylem. In the stem, the periderm develops in a superficial position.

Each of the salient structural features enumerated in the two preceding paragraphs occurs in the Magnoliaceae, and similar combinations of these structural characters are formed in tropical representatives of that family. In fact, the similarities are so close that it is difficult to differentiate the stems of the two families without a detailed study of their nodal anatomy. On the contrary, the stems of *Himantandra*, although of the same general structural type as in *Degeneria* and the Magnoliaceae, may be differentiated by the occurrence of alternate multiseriate pitting in the vessels of the secondary xylem and by a less conspicuous stratification of the phloem into alternating strands of hard and soft bast.

**LEAF AND NODAL ANATOMY.** In *Degeneria* five traces enter the base of the petiole, leaving five gaps in the cauline vascular cylinder, i.e. the plant has a penta-lacunar node. The traces divide in their outward course, forming numerous vascular bundles that become oriented into a cylindrical foliar stele. This medullated foliar stele (*fig. 27*), which tends to have a more or less flattened adaxial surface, extends through the petiole and the midrib of the leaf.

The vascularization of the leaf exhibits fundamental similarities to that which occurs in *Himantandra* and the Magnoliaceae, but differs markedly from that which characterizes the Winteraceae, Eupomatiaceae, Annonaceae, Schizandraceae, etc. In *Degeneria*, as in *Himantandra* and the Magnoliaceae, the vascular bundles that branch outward from the median trace are segregated into two groupings on opposite sides of the foliar vascular cylinder. In other words, one or more of them retain a normal orientation of xylem and phloem and form part of the abaxial surface of the foliar stele, whereas the remaining ones develop an inverted orientation of xylem and phloem and form part of the adaxial surface of the foliar vascular cylinder.

*Himantandra* is characterized by having a tri-lacunar node instead of a penta-lacunar one as *Degeneria*. Although the number of traces that pass outward into the petiole of the Magnoliaceae fluctuates from three to five to many, the nodes of these plants may be distinguished from those of *Himantandra* and *Degeneria* by the fact that they have an additional trace which is concerned primarily in the vascularization of the stipules. This trace occurs on the opposite side of the cauline stele from the median trace of the leaf.

The leaves of *Degeneria*, like those of *Himantandra*, have no stipules, but the leaf-blades of the former genus resemble those of the Magnoliaceae in having stomata with conspicuous subsidiary cells oriented parallel to the

guard cells, numerous large spherical oil cells, etc. The leaves of *Himantandra* are characterized by having their stomata arranged in circles under each of the peltate scales which cover the lower surface of the lamina.

FLOWERS. Solitary supra-axillary flowers characterize *Degeneria*. In the Magnoliaceae the only genera with axillary bisexual flowers are *Elmerrillia* Dandy and *Michelia* L., and here solitary flowers are unusual. The axillary flowers of *Himantandra* are sometimes solitary. The fact that the pedicels of *Degeneria* are bracteate near the middle may indicate that the inflorescence is reduced from a more complex structure and that the supposed pedicel is partially peduncular in origin.

The floral axis of *Degeneria*, unlike that of most Magnoliaceae, is short (fig. 4), and the solitary indehiscent carpel is attached in a depression on the apex of the torus (fig. 28); this annular apex of the torus is formed at least in part by the fused bases of the stamens and staminodes. A similar apical depression of the torus occurs in *Himantandra*. The vascularization of the floral axis of *Degeneria* and *Himantandra* is of a type commonly encountered in dicotyledons. On the contrary, that of the Magnoliaceae is characterized by its complexity. In addition to a normal dictyostele, the floral axis commonly exhibits a system of anastomosing and dichotomizing cortical bundles. The median vein of the sporophylls is attached to the inner dictyostele, whereas the lateral veins frequently connect with the outer cortical vascular cylinder.

The floral envelope of *Degeneria* is clearly differentiated at maturity into calyx and corolla, but, although the petals differ from the sepals in size and form (fig. 3), they resemble them in texture and in their internal cellular composition. In the Magnoliaceae the sepals and petals are usually sub-similar, all of the tepals commonly having a more typically petaloid form, texture, and internal structure. Most early descriptions of the perianth-arrangement in *Himantandra* mention the calyx as composed of two closed calyptrate sepals, one within the other. Diels (in Bot. Jahrb. 55: 126. 1917) describes these organs as calyptriform bracts and states that sepals and petals are lacking. As the flower of *Himantandra* matures, first one and then the other of these calyptriform organs is lost, leaving closely approximated circular scars at the base of the floral axis. In this connection, however, it should be noted that serial transverse sections of young flower-buds suggest that the calyptriform organs are not single modified appendages, but rather represent fused parts of a perianth. Their internal cellular structure closely resembles that of the sepals and petals of *Degeneria*. Therefore it seems likely that they should be interpreted as a calyptra of fused petals enclosed within a calyptra of fused sepals, just as the single calyptra of *Eupomatia* is regarded as having arisen from fused parts of a perianth.

STAMENS AND STAMINODES. The stamens of *Degeneria* are not differentiated into filament, anther, and connective, and are best described as broad micro-sporophylls (figs. 15 and 18) having four slender elongated sporangia that are immersed beneath the abaxial surface of the sporophyll. The



stamens have a conspicuous median vein that dichotomizes at its apex and two lateral veins situated near the margins of the sporophyll (*fig. 15*). The paired sporangia are not located in close relationship to either the median or the lateral veins and thus are not in direct contact with vascular tissue. The staminodes, formed at a higher level of the floral axis, are hooded and have three parallel veins (*fig. 17*). Occasionally one of these hooded organs bears rudimentary micro-sporophylls (*fig. 16*).

The stamens of *Himantandra* are of a fundamentally similar morphological type, but they are much longer and have shorter basally disposed sporangia. Three veins enter the base of the stamens and staminodes, as in *Degeneria*, but the lateral veins frequently do not extend beyond the lower third of the micro-sporophylls. The veins of unusually large stamens may form short lateral veinlets, but these vascular branches are not oriented in relation to the sporangia. In *Himantandra* staminodes occur both below and above the fertile micro-sporophylls.

Although the stamens of the Magnoliaceae differ markedly in having large, protuberant, usually marginally placed pairs of elongated sporangia, they are characterized by having a similar type of vascularization. Many representatives of the family, in addition to a conspicuous median vein, exhibit two lateral veins at the base of the stamen which extend outward for varying distances. Here again, neither the lateral veins nor their branches are related in distribution to the sporangia. In certain of the Magnoliaceae, e. g. species of *Michelia*, the lateral veins are much reduced or are entirely eliminated.

**POLLEN.** The pollen grains of *Degeneria* are broadly ellipsoid in form, 45 to 55  $\mu$  long and 37 to 42  $\mu$  broad, their dimensions fluctuating considerably during varying degrees of re-expansion of the grains. They are typically of the so-called monocolpate type, having a single narrow furrow (*fig. 12*), which broadens markedly at both poles of the grain. The outer exine is smooth except in the region of the furrow, where it is finely and irregularly pitted. During the later stages of the re-expansion of the pollen grains, this layer tends to split in the broader polar parts of the furrow and thus to allow the contents of the grain to bulge outward. In pollen that has been re-expanded by a brief treatment in dilute NaOH, the furrow of the outer exine is subtended by a broad band of much swollen, finely and uniformly pitted material (*figs. 13 and 14*). This porous layer dissolves along with the contents of the grain during more prolonged treatments with NaOH, leaving the outer exine as the only residue.

Monocolpate pollen grains of similar size and form, having similar polar extensions of the furrow, occur in various representatives of the Magnoliaceae. Our colleague, Dr. A. O. Dahl, has demonstrated experimentally that even in the pollen grains of *Magnolia stellata* (Sieb. & Zucc.) Maxim., *M. denudata* Desr., and *M. salicifolia* (Sieb. & Zucc.) Maxim. the pollen tubes frequently emerge at the poles, rather than at the sides, of the grains. The pollen grains of *Himantandra* are smaller and of more nearly spherical form. They have a thin, smooth outer surface, but are provided with a single furrow and thus are also of the monocolpate type.

CARPEL. *Degeneria* is characterized by having a single indehiscent carpel (figs. 4, 30). In *Himantandra* the carpels are several, usually more or less coherent at the base, at length concrescent and indehiscent. The Magnoliaceae usually have numerous carpels, which frequently are coherent at the base; the carpels commonly are dehiscent, but in some cases are indehiscent and then concrescent. Reduction in the number of carpels is infrequent in the Magnoliaceae, but in certain cases, such as *Pachylarnax* Dandy, these organs may be reduced to two. It should be noted in this connection that reduction to a single carpel occurs in several species of the Winteraceae.

The carpel of *Degeneria*, preceding and during anthesis, resembles an adaxially folded, 3-veined sporophyll (fig. 22), in which the lateral veins, the narrow linear placentas, and the two rows of numerous ovules are quite remote from the margins of the macro-sporophyll. Furthermore, the margins of the carpel are not infolded or coherent during ontogeny, but tend to flare apart externally (figs. 22 and 23). The placentation is clearly laminar and adaxial. At anthesis, broad areas (between the margins and the placentas) of the adaxial surface of the macro-sporophyll are closely approximated, but are not actually coherent except in the basal part of the carpel. The epidermal layers of the two adjacent adaxial surfaces are separated by numerous, loosely interlocking, short, glandular hairs. Thus the stigmatic areas of the carpel of *Degeneria* are not localized externally upon the recurved margin of the sporophyll, but extend inward along the adaxial surfaces of the carpel into close proximity to the placentas. During the development of the fruit, the contiguous adaxial surfaces of the carpel become concrescent, the outwardly recurved margins of the sporophyll persisting as parallel corky ridges. The ovules of *Degeneria* are of the anatropous type illustrated in figs. 20 and 21. The vascular bundle of the ovule is conspicuously coiled in its course through the funicle.

FRUIT. The mature fruit of *Degeneria* is inequilaterally oblong-ellipsoid, marked on the ventral side by the elongated stigmatic ridges described above. The coriaceous pericarp is smooth without, while the endocarp is irregularly ridged, possibly due to the pressure of the developing seeds (although even when the seeds are abortive, these ridges are discernible). In addition to these subcoriaceous ridges, the endocarp bears small irregular waxy appendages, these being especially apparent in the placental regions. Often these appendages appear somewhat cupuliform about the bases of seeds, with which they are frequently detached (fig. 11); however, the appendages have no attachment to the seeds and are strictly endocarpic in origin. Having no fresh fruits to study, we cannot be sure of the significance of these appendages nor of the inner consistency of the fruit.

The seeds are in two rows and the attachment is still apparent in nearly mature fruits (fig. 10). Those of one row are strictly sessile, while those of the other row are borne on slender elongated funicles. Apparently there is a substantial proportion of sterility in the seeds of *Degeneria* (as not infrequently in the Magnoliaceae and related groups), for none of our seeds

contain embryos. Attempts to germinate some of them, in order to obtain a chromosome count, having failed, we dissected others and failed to find any embryos or any endosperm which could be interpreted. The external coarse reticulation of the seeds is characteristic. The single fruit accompanying the type collection is not quite mature but bears a full complement of seeds (fig. 10). The fruits of the Smith specimen (fig. 2), however, although essentially similar externally, have only a few seeds developed (and these sterile), the majority of the ovules being atrophied and dried upon the walls of the large cavity.

The fruits of the Himantandraceae and Magnoliaceae are so different from those of *Degeneria* as to make comparison unnecessary for the time being. However, the presence of a slender elongated funicle in *Degeneria* and in many Magnoliaceae is noteworthy; such a funicle is not found in *Himantandra*. Superficially, the fruit of *Degeneria* suggests that of certain species of Winteraceae, although these as a rule are much smaller. However, an undescribed New Guinea species of *Bubbia* v. Tiegh. has a large fruit remarkably similar to that of *Degeneria*, differing, however, in its small several-seriate seeds without funicles and in various other details.

CONCLUSIONS. The various families of the ranalian complex exhibit similarities and differences in their vegetative and floral organs that are indicative of reticulate rather than linear relationships. Certain of the morphological similarities may be, and probably are, due to parallel specialization from a common ancestry, whereas others represent retentions of structures that characterized the primitive ranalian stock. Therefore, in discussing the relationships of the various families of the Ranales, it is essential to consider and carefully to weigh evidence from *all* organs and parts of the plants.

The salient morphological features of the vegetative organs of *Degeneria* closely resemble those of the Magnoliaceae, plants of the latter family differing chiefly in the presence of stipules and a correspondingly more complex type of vascularization of the leaf. The absence of stipules in *Degeneria*, in itself, is not sufficient grounds for excluding the genus from the Magnoliaceae, particularly as the petioles are provided with marginal expansions (fig. 29) that envelop the "growing point" during early stages of their ontogeny. The successively formed leaves of magnoliaceous seedlings not infrequently exhibit transitions between such foliar structures and leaves with conspicuous stipules. At the same time, the vascularization of the seedling leaves becomes increasingly complex. Thus, the chief justifications for excluding *Degeneria* from the Magnoliaceae are to be found in its reproductive rather than in its vegetative organs. Here the morphological differences are numerous and extensive, significant similarities occurring, however, particularly in the pollen and in the vascularization of the stamens.

Although the flowers of *Degeneria* resemble those of *Himantandra* in their remarkable stamens, in their compressed floral axes, and in the presence of numerous staminodes, the morphology of the carpels and the



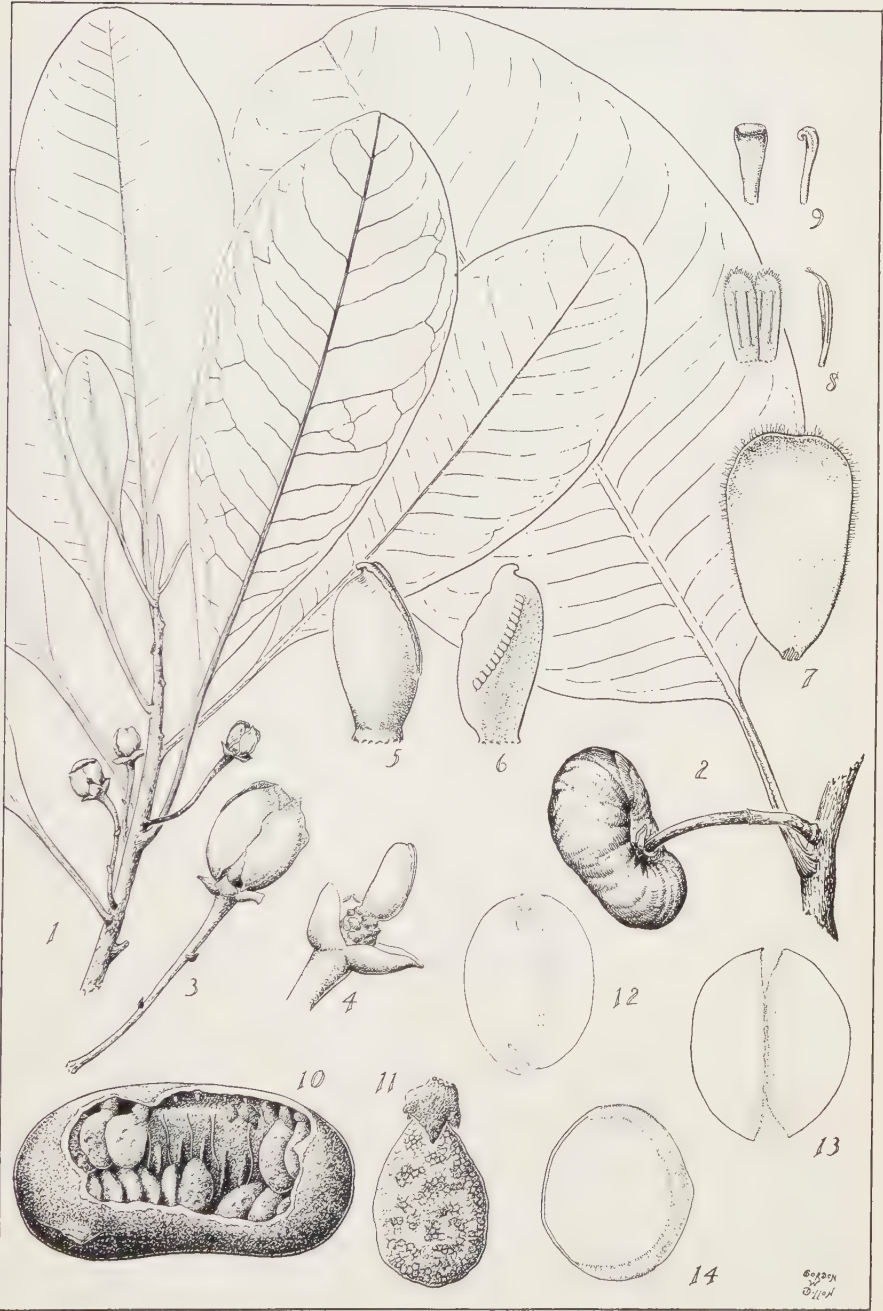
calyptriform perianth-parts of the latter genus present serious obstacles to the inclusion of *Degeneria* in the Himantandraceae. Furthermore, although the vascularization of the stem and leaf is of a fundamentally similar type in *Degeneria* and *Himantandra*, the xylem and phloem of *Degeneria* are indicative of a closer structural relationship to the Magnoliaceae than to the Himantandraceae. Of course, the peculiar distribution of the stomata and the peltate scales of *Himantandra* have no counterparts in either the Degeneriaceae or Magnoliaceae.

The reproductive organs of *Degeneria* exhibit similarities to those of certain representatives of the Winteraceae (exclusive of *Illicium*). Such similarities occur at times in the form and texture of the perianth, in the reduction of the carpels to one, in the morphology of the carpel, in the formation of numerous ovules, and in the gross appearance of the fruit. However, the stamens—as regards both their form and their vascularization—are of a fundamentally different type throughout the Winteraceae. The pollen grains differ profoundly in their salient morphological features and no staminodes are formed in the Winteraceae. In addition, the internal structure of the vegetative organs of *Drimys* and its segregates is entirely unlike that of *Degeneria*. The vascularization of the leaf is of a fundamentally different type, and the structure of the vesselless xylem and of the phloem is indicative of a rather remote relationship of the Winteraceae to the Degeneriaceae, Himantandraceae, and Magnoliaceae.

In conclusion, it should be emphasized that extensive comparative investigations of the stamens and carpels of the Ranales are needed, since the remarkable sporophylls of *Degeneria* may afford clues for visualizing diverse trends of morphological specialization in these organs.

In the following analyses we point out the salient features of the Degeneriaceae and its closest allies:

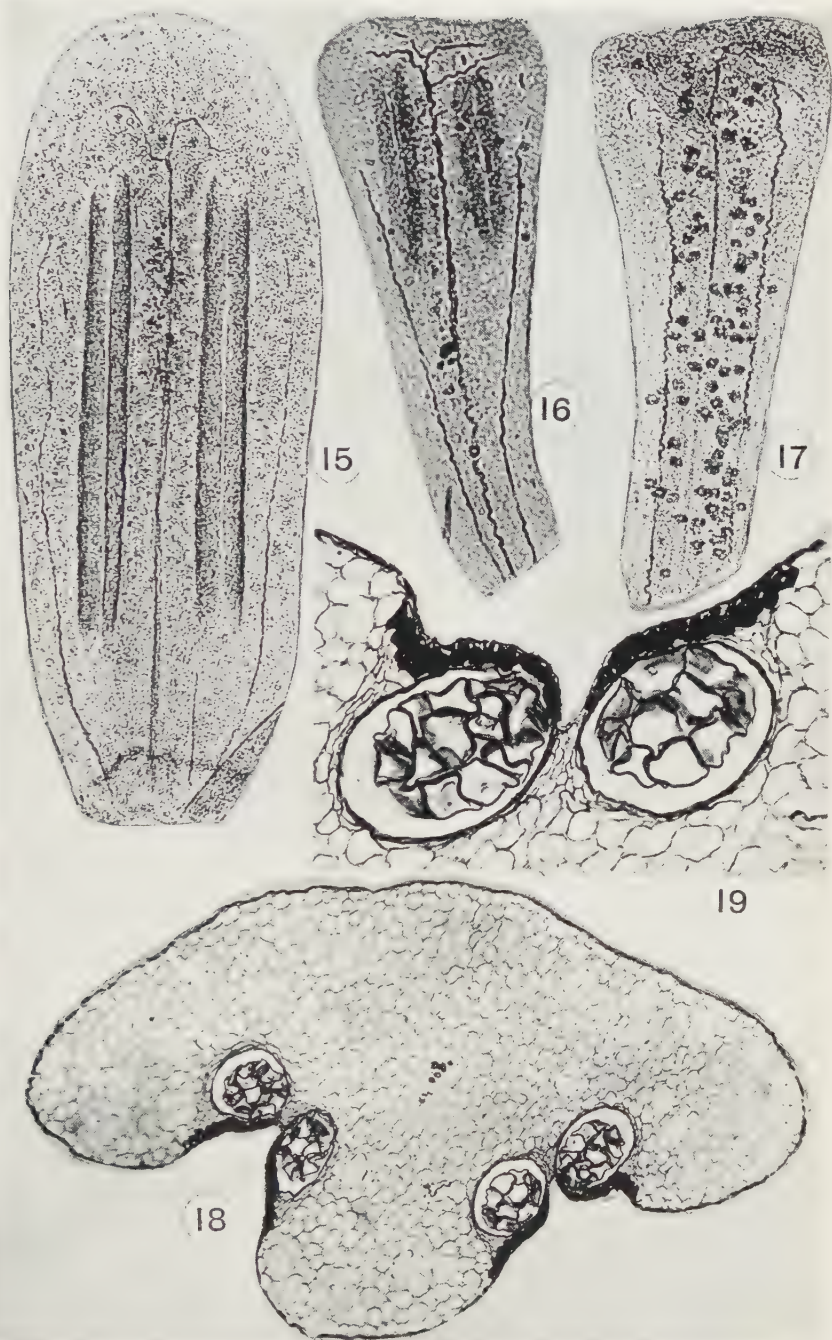
- Stipules none; sepals much smaller than petals and very distinct from them; floral axis short, broader than long, depressed at apex; anthers dehiscing extrorsely, the pollen-sacs not protuberant; staminodes present within the stamens, cucullate; carpel solitary, open along the ventral suture when young; ovules numerous (24–26); carpel indehiscent, the seeds biseriate, those of one series sessile, of the other series conspicuously funiculate. . . . . Degeneriaceae.
- Stipules present; sepals usually subsimilar to petals; floral axis usually elongated; anthers dehiscing introrsely or laterally (extrorsely in *Liriodendron*), the pollen-sacs protuberant; staminodes none; carpels numerous, very rarely as few as 2 (in *Pachylarnax*), never solitary, closed along the ventral suture; ovules few or several, seldom more than 10; carpels usually dehiscent, concrescent if indehiscent; funicle often elongate. . . . . Magnoliaceae.
- Stipules none; copious peltate scales present on branchlets, lower leaf-surfaces, and inflorescence-parts; perianth composed of a calyptra of fused petals within a calyptra of fused sepals; floral axis short, depressed at apex; anthers dehiscing extrorsely, the pollen-sacs not protuberant; staminodes present both without and within the stamens, not cucullate; carpels several, closed along the ventral suture; ovules 1 or 2; fruit composed of coalesced carpels; funicle not elongate. . . . . Himantandraceae.



DEGENERIA VITIENSIS Bailey and Smith

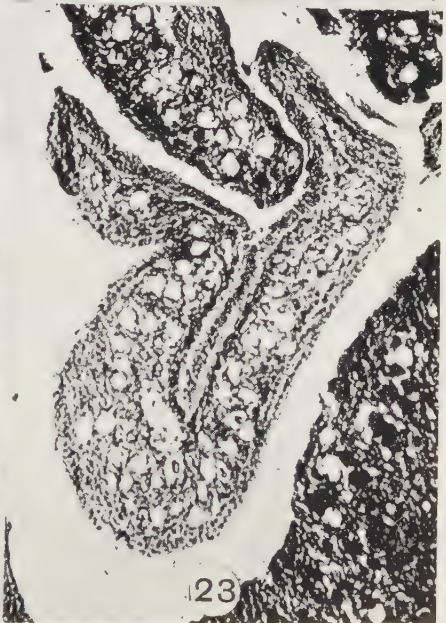
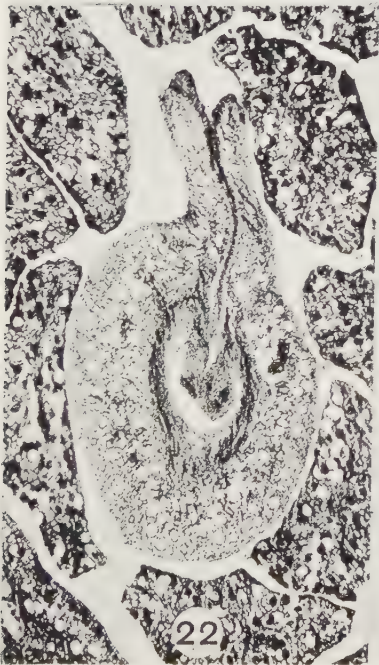






DEGENERIA VITIENSIS Bailey and Smith

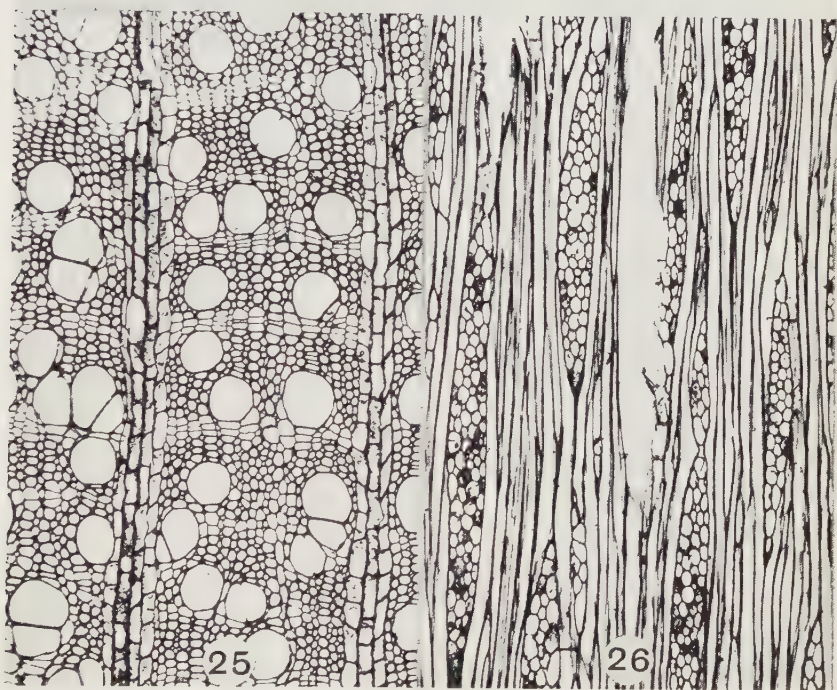




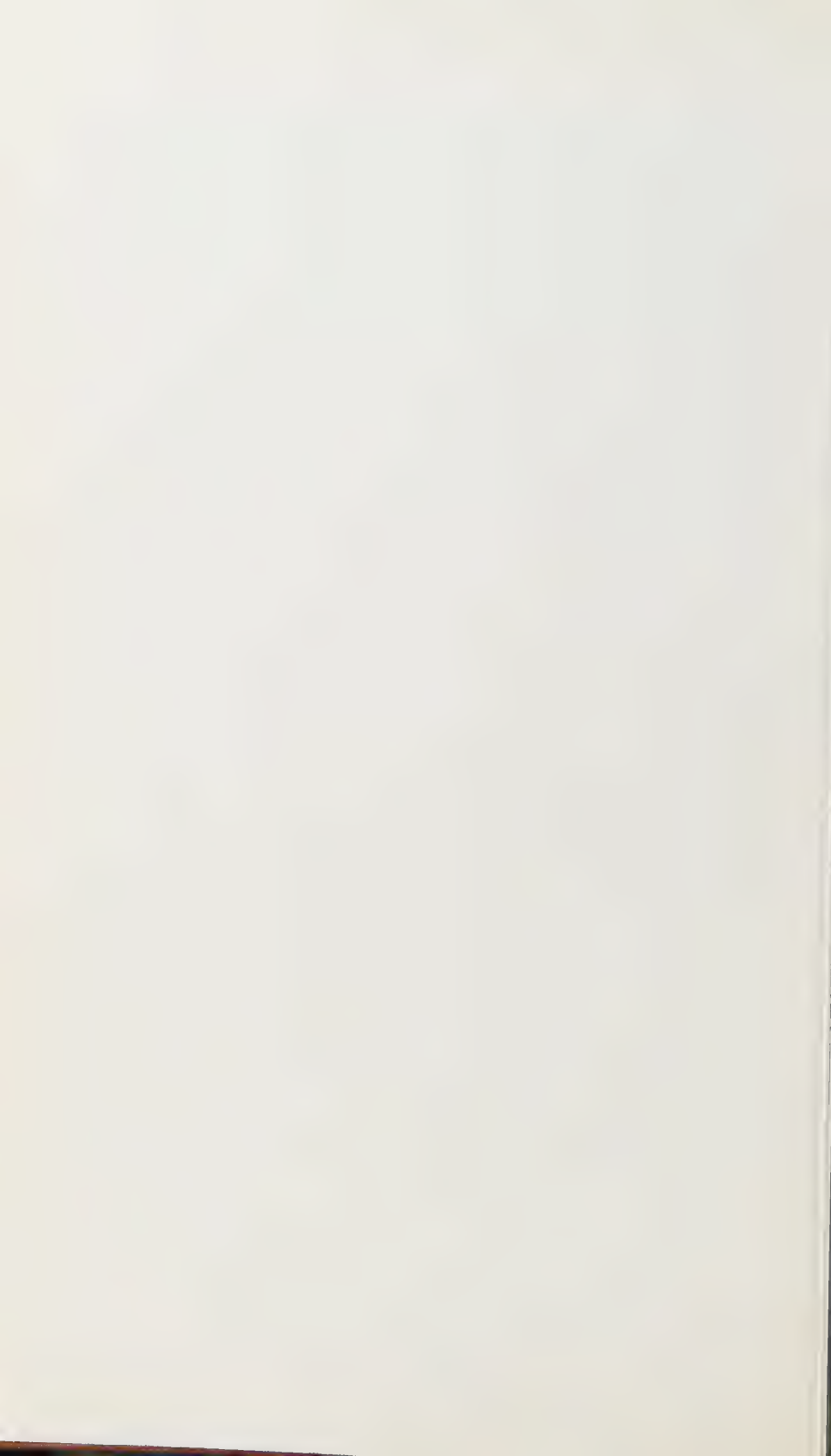
DEGENERIA VITIENSIS Bailey and Smith







DEGENERIA VITIENSIS Bailey and Smith







DEGENERIA VITIENSIS Bailey and Smith



Stipules none; sepals often much smaller than petals, sometimes (in *Drimys*) calyptriform; floral axis short, not depressed at apex; anthers dehiscing apically, subapically, or laterally, the pollen-sacs protuberant; staminodes none; carpels many to few, sometimes solitary, closed along the ventral or apical stigmatic suture; ovules few to many; carpels indehiscent, the seeds without elongated funicles..... Winteraceae.

## EXPLANATION OF PLATES

All plates illustrate *Degeneria vitiensis* I. W. Bailey and A. C. Smith. All figures are drawn or photographed from *Degener 14537* except figs. 2, 25, and 26, which are from *Smith 1754*.

## PLATE I

Fig. 1. Flowering branchlet,  $\times \frac{1}{2}$ ; 2. Fruiting branchlet,  $\times \frac{1}{2}$ ; 3. Flower at anthesis,  $\times 1$ ; 4. Floral axis, with petals, stamens, and staminodes removed, slightly after anthesis,  $\times 2$ ; 5. Side view of carpel, slightly after anthesis,  $\times 4$ ; 6. Longitudinal section of carpel,  $\times 4$ ; 7. Petal, inner surface,  $\times 2$ ; 8. Stamens, extrorse and lateral views,  $\times 2$ ; 9. Staminodes, introrse and lateral views,  $\times 2$ ; 10. Fruit, nearly mature, with a portion of wall removed to show seeds, funicles, and ridges and appendages of the endocarp,  $\times 1$ ; 11. Seed and portion of the endocarpic appendages,  $\times 3$ ; 12. Pollen grain re-expanded and mounted in lactic acid,  $\times 300$ ; 13. Pollen grain after brief treatment in NaOH, mounted in lactic acid,  $\times 300$ ; 14. Pollen grain after similar treatment, optical section,  $\times 300$ .

## PLATE II

Fig. 15. Stamen re-expanded and cleared in dilute NaOH, showing sporangia and median and lateral veins,  $\times 24$ ; 16. Hooded staminode with rudimentary sporangia,  $\times 24$ ; 17. Hooded, 3-veined, typical staminode,  $\times 24$ ; 18. Transverse section of re-expanded and cleared stamen, showing four sporangia and four short arcs of endothecium,  $\times 107$ ; 19. Part of fig. 18 more highly magnified,  $\times 260$ .

## PLATE III

Fig. 20. Transverse section of carpel just after anthesis, showing ovules,  $\times 31$ ; 21. Sagittal section of ovule,  $\times 260$ ; 22. Transverse section of young carpel at level of locule,  $\times 31$ ; 23. Transverse section of young carpel above level of locule,  $\times 64$ .

## PLATE IV

Fig. 24. Transverse section of young secondary phloem, showing flaring rays and strands of hard and soft bast,  $\times 107$ ; 25. Transverse section of mature secondary xylem,  $\times 50$ ; 26. Tangential longitudinal section of mature secondary xylem,  $\times 50$ .

## PLATE V

Fig. 27. Transverse section of petiole, showing foliar vascular cylinder,  $\times 27$ ; 28. Transverse section at base of flower-bud, showing carpel in apical depression and surrounded by ring-shaped crown of torus,  $\times 8$ ; 29. Transverse section at apex of vegetative shoot, showing clasping bases of young leaves,  $\times 39$ ; 30. Transverse section of flower bud, showing petals, stamens, staminodes and carpel,  $\times 8$ .

BIOLOGICAL LABORATORIES AND ARNOLD ARBORETUM,  
HARVARD UNIVERSITY.

## A NOMENCLATURAL NOTE ON THE HIMANTANDRACEAE

A. C. SMITH

THE family Himantandraceae, proposed by Diels in 1917, is now generally accepted by botanists as a distinct family of the order Ranales, related to the Magnoliaceae. However, there has been disagreement as to the correct name for its single genus, whether *Himantandra* F. v. Muell. or *Galbulimima* F. M. Bailey. In an effort to decide which of these names to use, the literature referring to the group has been searched as thoroughly as possible.

The first mention of a plant referable to the family was in 1887, when F. v. Mueller (in Austral. Jour. Pharm. **2**: 4; in Bot. Centralbl. **30**: 325) described the species *Eupomatia Belgraveana*, based on *Forbes* 759 from New Guinea. The description of the species is adequate, but the only mention of the name *Himantandra* occurs in the remark that "... this *Eupomatia* might subgenerically or perhaps even generically be separated (as *Himantandra*) . . ." A statement of Mueller's that "... a description has been prepared for the 9th part of the 'Papuan Plants' " gives a clue to the next mention of the species.

Such mention (F. v. Muell. Pap. Pl. **2**: 54. 1890) has apparently been overlooked by subsequent students. Although no description is given, Mueller lists the plant as *Himantandra Belgraveana* and refers to the original place of description of *Eupomatia Belgraveana*, thus expressing his definite opinion that the species is generically distinct from *Eupomatia*.

In 1894 F. M. Bailey (in Queensl. Dept. Agr. Bot. Bull. **9**: 5. 1894) described *Galbulimima* as a new genus, placing it in the family Magnoliaceae, tribe Winteraeae; a single species, *G. baccata*, based on a specimen from Queensland, was proposed. Both genus and species are adequately described.

In 1912 Diels (in Bot. Jahrb. **49**: 164) presented the first formal description of the genus *Himantandra*, proposing the binomial *H. Belgraveana* (F. v. Muell.) Diels under the impression that this was a new combination. In 1917 Diels (in Bot. Jahrb. **55**: 126-134) proposed the family Himantandraceae, discussing it in detail and making the new combination *H. baccata* (F. M. Bailey) Diels.

In 1915 Sprague (in Hook. Ic. Pl. **31**: pl. 3001) had redescribed Bailey's genus and species (*Galbulimima baccata*), placing the genus in the family Magnoliaceae, tribe Illicieae. In 1922 (in Jour. Bot. **60**: 137) he pointed out that *Himantandra* had not been proposed as a genus by Mueller in 1887. In this it appears that Sprague is correct and that Mueller's original mention of the genus was as a *nomen provisorium* and did not constitute



valid publication. This conclusion is the opposite of that reached by Diels in 1917.

Neither Diels nor Sprague mentions Mueller's publication of 1890, which appears to validate the name *Himantandra* beyond question and in advance of Bailey's publication of *Galbulimima*. Although Mueller, in 1890, published the combination *Himantandra Belgraveana* without indicating it as the basis of a new monotypic genus, this implication is obvious in his reference to the original place of publication of *Eupomatia Belgraveana*. Thus Mueller has given a reference to an adequate description which may be taken as a *descriptio generico-specifica* and has validated the generic name *Himantandra* (see Internat. Rules of Bot. Nomenclature ed. 3. Art. 43. 1935).

It appears that E. G. Baker and Norman (in Jour. Bot. **61**: Suppl. 2. 1923) did not accept Sprague's interpretation, for they proposed two new species in the genus *Himantandra*. Sprague (in Jour. Bot. **61**: 200. 1923) promptly reiterated his opinion and transferred the two recent new species to *Galbulimima*.

Thus we have a group of four species for which the eight possible binomials have been used. Since 1923 students of the group have used the name *Himantandra*, but none of them has cited Mueller's paper of 1890 in support of his stand. Without considering this paper, Sprague's interpretation would seem to be correct and the name *Galbulimima* would have to be used, but since this paper exists I conclude that we may definitely accept 1890 as the date of authentic publication of the generic name *Himantandra*.

Following is the synonymy of the group and citation of all the references which I have been able to locate. Whether or not all the species will prove acceptable cannot be stated at present.

HIMANTANDRACEAE Diels in Bot. Jahrb. **55**: 126. 1917; Hutchinson in Kew Bull. **1921**: 186. 1921, Fam. Fl. Pl. Dicot. 84. 1926.

**Himantandra** F. v. Muell. in Austral. Jour. Pharm. **2**: 4, *nomen provisorium*. 1887, in Bot. Centralbl. **30**: 326, *nomen provisorium*. 1887, Pap. Pl. **2**: 54. 1890; Diels in Bot. Jahrb. **49**: 164, as *Himatandra*. 1912, in Bot. Jahrb. **55**: 127. 1917.

*Galbulimima* F. M. Bailey in Queensl. Dept. Agr. Bot. Bull. **9**: 5. 1894, Queensl. Fl. **1**: 19. 1899; Sprague in Hook. Ic. Pl. **31**: pl. 3001. 1915, in Jour. Bot. **60**: 137. 1922, in Jour. Bot. **61**: 200. 1923.

1. **Himantandra Belgraveana** (F. v. Muell.) F. v. Muell. Pap. Pl. **2**: 54. 1890; Diels in Bot. Jahrb. **49**: 165. f. 6, as *Himatandra B.* 1912; Hall. f. in Arch. Néerl. Sci. Exact. Nat. IIIB. **1**: 188. 1912; Diels in Bot. Jahrb. **52**: 186. 1915, in Bot. Jahrb. **55**: 127. f. 1. 1917; Bak. f. & Norman in Jour. Bot. **61**: Suppl. 3. 1923; Lane-Poole, Rep. For. Res. Papua 86. 1925; Hutchinson, Fam. Fl. Pl. Dicot. f. 4. 1926; White & Francis in Proc. Roy. Soc. Queensl. **39**: 62. 1928.

*Eupomatia Belgraveana* F. v. Muell. in Austral. Jour. Pharm. **2**: 4. 1887, in Bot. Centralbl. **30**: 325. 1887.

*Galbulimima Belgraveana* Sprague in Jour. Bot. **60**: 138. 1922.

2. **Himantandra baccata** (F. M. Bailey) Diels in Bot. Jahrb. **55**: 128. 1917.

- Galbulimima baccata* F. M. Bailey in Queensl. Dept. Agr. Bot. Bull. **9**: 5. 1894, Queensl. Fl. **1**: 19. 1899, Compr. Cat. Queensl. Pl. 25. f. 8. 1913; Sprague in Hook. Ic. Pl. **31**: pl. 3001. 1915, in Jour. Bot. **60**: 138. 1922; Domin in Bibl. Bot. **22** [Heft 89]: 115. 1925.
3. **Himantandra nitida** Bak. f. & Norman in Jour. Bot. **61**: Suppl. 2. 1923.  
*Galbulimima nitida* Sprague in Jour. Bot. **61**: 200. 1923.
4. **Himantandra parvifolia** Bak. f. & Norman in Jour. Bot. **61**: Suppl. 2. 1923.  
*Galbulimima parvifolia* Sprague in Jour. Bot. **61**: 200. 1923.

ARNOLD ARBORETUM,  
HARVARD UNIVERSITY.

## NEW SPECIES OF CROTON L. FROM NEW GUINEA

LEON CROIZAT

THIS is the first of a proposed series of papers on the Euphorbiaceae of New Guinea prepared in connection with a study of various other Malaysian species of *Croton*. The paper is based essentially on material collected by Mr. L. J. Brass, botanist on the three expeditions to New Guinea under the sponsorship and leadership of Mr. Richard Archbold of New York. References are included to other collections from New Guinea and neighboring islands that have been assembled at the Arnold Arboretum in recent years. All specimens are deposited in the herbarium of the Arnold Arboretum of Harvard University.

***Croton morobensis* sp. nov.**

Arbor ad 15 m. alta. Innovationibus inflorescentiisque stellato-tomentosis citius glabrescentibus, indumento sordide ochraceo. Foliis ovatis vel elliptico-ovatis, apice breviter acuminatis basi rotundatis, 20–10 cm. longis, 10–7.5 cm. latis, in sicco brunneis, supra nitidis vel subnitidis, subtus indumento stellato persistente dissite tomentellis, margine repando-serratis, dentibus plus minusve glandulosis fere alterna vice majoribus minoribusque ad 3 per 1 cm. longitudinis; nervis primariis utrinque ca. 10-jugis, gracilibus, anastomosantibus valde obscuris; petiolo 1.5–5 cm. longo, sordide tomentoso, apice glandulis 2 posticis patelliformibus sessilibus ornato. Inflorescentia spicata, simplici, [videtur] 2-sexuali. Floribus ♂ haud visis. Floribus ♀ fructu delapso tantum lustratis: perianthio ad 5 mm. lato, pedicello ad 2–3 mm. longo, extus tomentello vel glabrato, lobis integerrimis, late triangularibus, ca. 2 mm. longis, petalis videtur nullis, disci glandulis 5 sat validis discretis; columella gracili, 4–5 mm. longa; coccis maturis levioribus, indumento stellato dissito, ad 8 mm. longis; semine ambitu fere tetragono, i.e., costis omnibus dorsali praesertim validis, obscure grossequ ruguloso brunneo, caruncula minima elongata cum hilo contigua, ca. 4–5 mm. longo, 4 mm. lato.

NORTHEASTERN NEW GUINEA: Morobe District, Lae, *M. S. Clemens* 10464.

I cannot place this new species. It is certainly not related with the group of *C. Verreauxii* Baill. (Sect. *Gymnocroton* Baill.) and very doubtfully with that of *C. argyratus* Blume. It might not be too far from *C. Wassi-Kussae* Croiz. but the material now available is inadequate for a systematic disposition.

***Croton Brassii* sp. nov.**

Arbuscula ad 6 m. alta. Innovationibus inflorescentiisque indumento crustaceo-lepidoto pallide aureis, serius glabratis. Foliis ellipticis, fere utrinque aequo jure acuminatis, apice interdum mucronatis, 8–4 cm. longis, 3–1.75 cm. latis, firme chartaceis, supra nigro-olivaceis vel brunneis, subtus indumento continuo discolori-aureis, margine integris, costa supra profun-

dus canaliculata subtus prominula, nervis obscuris utrinque ca. 6-jugis, jugo majore sub apice anastomosato saepe jugum minorem vel nervum solitarium amplexente, quapropter nervis totis in latere laminae quolibet ad 12–15, supra haud perspicuis; petiolo canaliculato, pallide aurato, 1–2.5 cm. longo, apice glandulis 2 subsessilibus anticis in laminae origine obsito. Inflorescentiis spicatis, 1- vel 2-sexualibus. Floribus ♂ : alabastro ca. 3 mm. magno, pedicello ca. 4–5 mm. longo, lobis triangulari-ovatis, 2.5 mm. longis, 1.5 mm. latis, petalis ovato-quadrangularibus ca. 2 mm. magnis, staminibus ca. 15, basi pilosis, extus serie staminodiorum circumdatis. Floribus ♀ : perianthio longius cyathiformi ca. 5–6 mm. longo, 5 mm. lato, lobis 5 triangularibus, 4 mm. longis, 1.75–2.5 mm. latis, acutis, erectis, apice subcallosis, basi extus per costulas in perianthium confluentibus, petalis quam lobis majoribus, late ovatis, 3.5 mm. longis 3 mm. latis, hic inde pilis stellatis obsitis, glandulis 5 sat magnis; ovario toto lepidoto, indumento secedibili, ad 3 mm. magno, stylis 3 ad basim liberis, quove in basim obtriangularem [2 mm. longam, 1.5 mm. latam] dilatatum dein in 3 lobis digitatis ad 2.5–3 mm. longis partito.

NETHERLANDS NEW GUINEA: 15 km. SW. of Bernhard Camp, Idenburg River, *Brass* 12061, January 1939, frequent in secondary mossy forest at 1800 m. slender tree 6 m. high.

A strong species suggesting in its gross morphology two very critical species, *C. metallicus* Seem., of the Fiji Islands, and *C. insularis* Baill. of New Caledonia and Eastern Australia, but altogether unlike them in floral characters.

***Croton Luciae* sp. nov.**

Arbor ad 21 m. alta. Innovationibus inflorescentiisque pube hispidula stellato-tomentosa velutinosus vel subpannosis, olivaceis vel sordide ochraceis, trichomatibus sub lente nempe glandulis commixtis [an revera succo indurato nigricante e hydatodiis minimis effuso?]. Foliis ambitu valde ludentibus, vulgo ellipticis, apice basique plus minusve acutatis vel cuneatis, interdum obovatis, basi truncatis, 15–8 cm. longis, 10–3 cm. latis, firme chartaceis vel subcoriaceis, supra brunneis, valde opacis, trichomatibus minutis persistentibus valde dissitis subruvidis, subtus indumento eadem ratione at confertiore sordide ochraceis tomentosus, nervis primariis patentibus, apice dichotomis, vix anastomosatis, ca. 8–10-jugis, supra gracillimis subtus plus minusve manifestis, margine primo intuitu integro sub lente repandulo-serrato, serraturis glandulosis; petiolo herbaceo canaliculato tomentoso, 2–9 cm. longo, apice glandulis 2 posticis crateriformibus stipitatis vel subsessilibus ornato. Inflorescentia spicata 1- vel 2-sexuali ad 20–25 cm. longa, sat valida. Floribus ♂ : perianthio ca. 8 mm. lato, 7 mm. longo, lobis grosse lepidoto-stellatis, extus ad basim hirtellis, 2 mm. longis, 3 mm. latis; petalis ovatis 3.5 mm. longis, ca. 3 mm. latis; staminibus ca. 15, [videtur] cum staminodiis commixtis, filamentis ca. 3 mm. longo, basi incrassato lanuloso. Floribus ♀ : perianthio ca. 10–12 mm. lato, 5–6 mm. longo, pedicello sat valido ca. 5–7 mm. longo, lobis triangulari-ovatis, cucullatis, ca. 3 mm. longis, totidem latis, basi glandula valida quove insignito, petalis ligulato-setaceis ca. 3 mm. longis ciliatis longius lanulosis; ovario depresso 5 mm. lato, 3 mm. longo, grosse tomentoso, ochraceo, stylis 3 more proprio ut sequitur cruciformibus; styli cujusvis parte basali 1.5 mm. longa integra, apice in ramulos 3-partita, ramulorum lateralium



[scilicet, crucis brachiorum] quove 1.5 mm. longo, ramulo apicali [scilicet, crucis capite] 2.5 mm. longo, ramulis omnibus totisque canaliculatis.

NETHERLANDS NEW GUINEA: Bele River, 18 km. N.E. of Lake Habbema, 2200 m. camp, *Brass & Versteegh 11121*, Nov. 1938, common substage tree of primary forest, 21 m. high, 29 cm. diameter; bark 6 mm. thick, fairly rough, with an odor; wood white; fls. yellow-green; fruit brown.

This outstanding new species has certain affinities with the Australian group of *C. arnhemicus* Muell.-Arg., and with *C. Boutonianus* Muell.-Arg. of the Island of Mauritius. Among the South American species, it somewhat suggests *C. piptocalyx* Muell.-Arg. and *C. celtidifolius* Baillon. This is apparently one of the archetypes of *Croton*, as it represents a biotype with almost complete pantropic distribution. I dedicate this species to my wife, deriving the specific epithet from her Christian name, in acknowledgment of her continuous assistance in my work.

***Croton philombros* sp. nov.**

Arbuscula. Innovationibus inflorescentiisque parcius lepidotis vel glabris. Foliis alternatis, lanceolatis vel elliptico-lanceolatis, apice plus minusve breviter acuminatis, interdum subfalcatis, basi rotundatis, firme chartaceis, in sicco pallide brunneis, vix evolutis parcius lepidotis, adultioribus citissime glabris, margine sub lente repandulo-serrato, nervis primariis delicatis ca. 10–12-jugis, late adscendentibus, gracillime anastomosatis; petiolo gracili 1.5–3.5 cm. longo, parcius tomentello-lepidoto, apice glandulis 2 posticis late patelliformibus subsessilibus ornato. Inflorescentia terminali spicata, 2-sexuali. Floribus ♂: perianthio 4–5 mm. lato, pedicello gracili 3–4 mm. longo, lobis late ovatis, petalis obovato-spathulatis magnitudine lobos aequantibus, ca. 2 mm. longis, 1.5 mm. latis, staminibus ca. 10, 3 mm. longis. Floribus ♀: perianthio ca. 4 mm. longo, 3 mm. lato, pedicello 1.5–2 mm. longo, lobis 5 imbricativis ca. 3.5 mm. longis 1.5 mm. latis, pellucido-punctatis, ramosae venosis, basi glandula quove aucto, petalis nullis; ovario globoso, 1.5 mm. magno, albicante, stellato- vel lepidoto-tomentoso, stylis 3 liberis, quove 1.5–2 mm. integro dein 1.5 mm. partito.

BRITISH NEW GUINEA: Western Division, Penzara, between the Morehead and the Wassi Kussa Rivers, *Brass 8455A* (holotype), December 1936, tree 4–6 m., rain-forest along creeks; same locality, *Brass 8440*, December 1936, creek fringing rain forest, compact tree 10 m.

Despite its having smaller ♀ flowers, *Brass 624*, collected in 1925 at Biriatabu, British New Guinea, and described as a compact tree in rain-forest, may also belong here.

*Croton philombros* is a species of Sect. *Gymnocroton* Baill., typified by *C. Verreauxii* Baill., which is endemic to Australia. Different authors have credited *C. Verreauxii* to various regions of Australasia including New Guinea, but their concept of the limits of Baillon's species is apparently so uncertain that I am not ready to accept their records before critically studying their specimens. Section *Gymnocroton* ranges from India to the Fiji Islands and consists of biotypes which are remarkably uniform in vegetative parts and gross floral morphology. These biotypes can be separated specifically only on the strength of intangibles and sums of minor characters. *Croton philombros* differs from authentic Australian material of *C. Ver-*

*reauxii* in the characters of the ♀ calyx and in certain intangibles of the foliage. Schumann described two species from New Guinea, *C. choristadenia* [sic] (Nachtr. Fl. Deutsch. Schutzgeb. Südsee 295. 1905) and *C. enantiophyllus* (op. cit., 296), stating that both have opposite leaves but that the latter has stigmas and foliage unlike *C. choristadenia* and 1-sexual inflorescences. It is exceedingly difficult, if at all possible, to form an opinion of Schumann's species from the descriptions, and I am by no means certain that his two binomials actually represent distinct entities. It is unlikely that either species has opposite leaves such as described by Schumann, because a phyllotaxy of this kind is found in *Croton* only as an exception, that is, on shoots on which the foliage is verticillate or subverticillate, suggesting to a casual observer that the leaves may be opposite. Taking Schumann's descriptions at their face-value I suspect that his species belong to Sect. *Gymnocroton*, but I have seen no material from New Guinea that I can refer to either.

***Croton mallotophyllus* sp. nov.**

Arbuscula ad 8 m. alta. Innovationibus inflorescentiisque pube stellata longe hirta primum tomentellis, serius glabratis, pallide ochraceis. Foliis optime ellipticis, apice breviter acuminatis, basi rotundatis subtruncatisve, levissime auriculatis, 23–9 cm. longis, 8–3 cm. latis, tenuiter chartaceis, in sicco utrinque viridibus, margine sub lente crenato-repandulis, crena qualibet glandula aucta, crenis ipsis ad 4 per 1 cm. longitudinis, nervis primariis ca. 10–14-jugis, gracilibus, sat procul a margine anastomosatis, nervo medio validiore, supra glabris, subtus pube minuta dissita tomentellis, petiolo ca. 5 cm. longo, hispidotomentoso, apice glandulis 2 posticis sessilibus ornato. Inflorescentia simplicis, spicata. Floribus ♂ ignotis. Floribus ♀: perianthio hispido tomentello pallide luteo, ca. 3 mm. magno, petalis nullis, lobis 5 late ovatis hyalinis, ad 2 mm. longis, 1–1.25 mm. latis, medio tenuissime nervosis hic inde [videtur] ceraceo-glandulosis, dorso hispidotomentellis, apice indumento confertiore, glandulis [videtur] in torum continuum cyathiformem sub ovario connatis; ovario ca. 2 mm. magno, rotundato, apice breviter libero, hispidulo, pallide lutescente, stylis 3 fere ad basim partitis, ad 2 mm. longis, quove primum integro, dein ad tertia duo supera partito, taeniato-applanato, epapilloso, nigricante.

NETHERLANDS NEW GUINEA: Nabire, *Kanehira & Hatusima* 11523, November 1940, sea level, in rain-forest, plant 8 m. high.

A strong species, unlike all others that I have so far seen from New Guinea, with a foliage somewhat reminiscent of that of *Mallotus Moritzianus* Muell.-Arg. To all appearances also belongs here *Kanehira & Hatusima* 11443, a sterile specimen collected at the same locality and at the same time as the holotype. *Croton mallotophyllus* is reminiscent of one of my species, *C. Merrillianus*, from Hainan, but this has larger ♀ flowers. It is possible that both belong to the same section.

***Croton pilargyros* sp. nov.**

Arbuscula. Innovationibus inflorescentiisque totis cinereo-tomentellis, sub lente hispidulis, demum glabrescentibus. Foliis late ovatis vel ovatis, apice abrupte acuminatis vel apiculatis, basi rotundatis subpeltatisve, 18–9

cm. longis, 14–6 cm. latis, primum indumento facillime detergibili totis griseo-tomentellis vel floccoso-tomentellis, demum supra glabris, saturate brunneis, subtus griseo-tomentellis, more *C. argyrati* formarum subnitidis revera haud argenteo-lepidotis, margine erosulis, subintegris, nervis primariis ca. 6–8-jugis patentius adscendentibus, primo jugo ramoso, anastomosibus delicatis at conspicuis; petiolo herbaceo, tomentello, 3–10 cm. longo, glandulis posticis 2 sessilibus insignito. Inflorescentia spicata, ad 20 cm. longa, bisexuali. Floribus ♂ glomerulatis: perianthio ca. 5–6 mm. lato, pedicello 6–7 mm. longo, lobis petalisque similibus, ca. 2 mm. longis ac latis, glandula [videtur] basi auctis, staminibus ca. 12, filamentis ca. 4 mm. longis, toro lanuloso. Floribus ♀ [videtur] singulis: perianthio ca. 4 mm. longo, 6–7 mm. lato, pedicello 3 mm. longo, lobis 3 mm. longis, 2 mm. latis, ligulatis, apice rotundatis, intus indumento subtili deciduo leviter pubescentibus, extus cum perianthii basi tomentosis, glandulis 5 sat magnis ambitu hispido-tomentosis; ovario globoso 2 mm. magno, griseo-tomentoso, stylis 3, ad basim brevissime connatis, supra liberis, quove primo 1 mm. integro, dein 3 mm. partito, nigricante.

BRITISH NEW GUINEA: Lower Fly River, east bank opposite Sturt Island, *Brass* 8062, October 1936, small substage tree on dry ridges in rain forest.

*Croton pilargyros* differs from *C. argyratus* Bl., which it very closely resembles in the vegetative characters, in range and in certain details of the flowers, as for instance the length and degree of pubescence of the lobes of the ♀ perianth and the size and pubescence of the glands under the ovary. It is probable that more substantial differences will be revealed when it will be possible to study the fruit, as in the forms of this affinity small variations in the ♀ flower usually prelude to the later evolution of patently unlike capsules and seeds.

It is worth noticing that the species of *Croton* in Malaysia and Australasia fall into few major aggregates, often as many as six to ten species resembling each other so closely in vegetative characters as to prove indistinguishable at first sight. A careful study of the ♀ flower and fruit reveals the specific characters, which are usually far from negligible and consist of differences in the shape and size of the lobes of the ♀ perianth, in the size of the capsule, in the sculpture of the seed, in the presence or absence of petals and the like. It is worth noticing, furthermore, that the species of *Croton* which differ in floral characters but not in foliage are endemic in regions which are known not to have undergone important climatic changes since the Tertiary's inception, such as Australasia. It may thus be tentatively inferred that there is present in the genus a tendency towards the evolution of the ♀ sexual organs which is active regardless of climatic influences. This tendency closely parallels that of the Euphorbiaceae as a whole, in which the floral structures constantly evolve in the direction of apetaly and unisexuality. Far reaching patterns of speciation, involving both floral organs and gross morphology, are apparent, on the other hand, in groups of species (for instance, *C. punctatus* Jacq., *C. texensis* Muell.-Arg. and *C. californicus* Muell.-Arg., endemic as a whole from Venezuela to California) found in regions that have experienced marked climatic vicissitudes in geological times.



***Croton pusilliflorus* sp. nov.**

Arbor parva. Innovationibus inflorescentiisque dissite furfuraceo-tomentellis, trichomatibus stellato-pannosis, citissime glabris, cortice adultiore griseo rimoso. Foliis ovato-ellipticis vel ellipticis, apice plus minusve breviter acuminatis, basi rotundato-cuneatis, 14–6 cm. longis, 5–2 cm. latis, in sicco brunneis, tenellis aequae ac adultis glabris, chartaceis, margine primo intuito vulgo haud profunde serratis, serraturis ad 3–5 per cm. longitudinis, dentibus callosis, venis primariis ca. 7-jugis patentius adscendentibus, anastomosibus delicatis interdum duplicatis; petiolo vulgo nec ultra 3 cm. longo, canaliculato, glandulis 2 subposticis apice insignito. Inflorescentia spicata, [videtur] 10–12 cm. longa. Floribus ♂ ignotis. Floribus ♀: perianthio ca. 2 mm. magno, pedicello brevi, vix ad 2 mm. etiam sub fructu longo, lobis ovatis apice callosis crassiusculis, ad 2 mm. longis et 1.25 mm. latis, quove glandula basali aucto; ovario lepidoto-tomentello, albicante ca. 1.25 mm. magno, stylis 3 fere ad basim liberis, quove primum integro dein partito, vix 1.5 mm. longis; coccis delapsis delicatis, 5–6 mm. longis, epicarpio secedibili brunneo sublevi, trichomatibus glandulosis dissitis parcius obsito, columella valde gracili ad 5–6 mm. longa, semine brunneo scaraboeideo ad 5 mm. longo et 4 mm. lato, in lateribus subcostulato, caruncula fere nulla, arillo hic inde sub lente maculato, testa sub lente acri vix granulato-striata.

BRITISH NEW GUINEA: Palmer River, below the junction with the Black River, *Brass* 7226, July 1936, substage tree 12 m. high, in gullies on the higher ridges, alt. 100 m.

Suggesting *C. cassinoides* Lam. of Madagascar in its vegetative characters. The small ♀ perianth, with a very short peduncle even in the fruit-stage, is characteristic.

***Croton semunculus* sp. nov.**

Arbuscula. Innovationibus inflorescentiisque primum leviter stellato-tomentosis, mox glabratis glabrisve, cortice adultiori striato griseo. Foliis late ellipticis vel ovato-ellipticis, 12–4 cm. longis, 6–3 cm. latis, basi rotundatis, interdum rotundato-truncatis, subcordatis, apice abrupte breviter acuminatis, glaberrimis, in sicco brunneis, firme chartaceis vel [videtur] tenuiter subcoriaceis, margine obscure repando-denticulatis, nervis primariis ca. 10-jugis, late patentibus, anastomosantibus valde delicatis; petiolo longitudine ludente, 1–3 cm. longo, obscurius canaliculato, apice glandulis 2 posticis sat magnis sessilibus patelliformibus ornato. Inflorescentia subspicata apicali. Floribus ♂: perianthio ca. 3 mm. magno, pedicello 3–4 mm. longo, staminibus ca. 12, filamento ca. 3 mm. longo, lobis ovatis, nervosis, ciliatis ca. 1 mm. longis latisque, basi glandula parva [videtur] auctis, petalis ligulatis 1.5 mm. longis et 1 mm. latis. Floribus ♀: perianthio ca. 2 mm. magno, pedicello 0.75–1.5 mm. longo, lobis triangularibus apice acutatis, carnosulis, basi glandula elongata auctis, petalis setaceis magnitudine ludentibus, ovario globuloso ca. 1.75 mm. magno, luteo-tomentoso, columella 3 mm. longa, gracili, semine badio maculis pallidis perspicuis hic inde notato, levissime costulato, vix longiore quam lato, 3 mm. longo, 2.5 mm. lato.

BRITISH NEW GUINEA: Central Division, Nakeo District, Baroka, *Brass* 3770, April 1933, common in rain-forest, tree 8–10 m.; fruit dry, 8 mm. long.

All the differences I can find between this new species and *C. pusilliflorus*



are the size and mottling of the seed and the presence of petals in the ♀ flower. The size and mottlings of the seed may or may not have specific significance in this exceedingly difficult group and the presence or absence of petals may or may not be relevant depending upon the persistency of the character. Better material will ultimately decide whether *C. pusilliflorus* and *C. semunculus* are distinct species, varieties of the same species or straight synonyms.

**Croton Ysabelae** sp. nov.

Arbuscula. Innovationibus inflorescentiisque primum dissite argillaceo-stellatis dein glabris, cortice vetustiore pallide ochraceo vel griseo. Foliis alternatis, late ellipticis, apice breviter acuminatis, basi cuneatis vel cuneato-rotundatis, 12–7 cm. longis, 5–3 cm. latis, chartaceis, in sicco brunneis, trichomatibus paucissimis subtus persistentibus exceptis glabris, margine primo intuitu subintegro cautius lustrato obscure repandulo-serrulato vel serrato, nervis primariis 6–8-jugis, late patentibus anastomosibus inconspicuis; petiolo dissite stellato-tomentoso, 1–3 cm. longo, glandulis 2 patelliformibus sessilibus apice utrinque insignito. Inflorescentia graciliori, longe spicata ad 20 cm. longa. Floribus ♂: perianthio ca. 2.5 mm. magno, staminibus ca. 10, petalis ligulatis. Floribus ♀: perianthio dissite tomentello, ca. 2 mm. longo, 3 mm. lato, pedicello ca. 1.5–2 mm. longo, lobis vulgo 5, interdum 7 triangularibus, 1.5 mm. longis, 0.75 mm. latis, basi glandula auctis, ovario obscure trigono, globuloso-depresso, 2 mm. crasso, 1 mm. longo, tomentello, stylis 3 habitu recurvis ad basim liberis, quoque ca. 1 mm. integro, dein 1.5–2 mm. partito.

SOLOMON ISLANDS: Ysabel Island: Tataba, Brass 3440, May 1933, rain-forest, a small tree, common.

Had this material been collected in Basilan, in the Philippines, it would be difficult to separate it from *C. basilanensis* Croiz. (*Tecson* 24949, 1915), a species in the vicinity of *C. consanguineus* Muell.-Arg. Brass 3440 cannot be referred to *C. Verreauxii* Baill., from which it is distinguished by many intangibles of floral and vegetative parts. Its leaves are not opposite, nor even characteristically whorled, and so it is not likely to prove to be the same as *C. choristadenia* K. Schum. or *C. enantiophyllus* K. Schum., as I interpret these from the descriptions. The ♀ flower is quite small.

**Croton Wassi-Kussae** sp. nov.

Arbuscula. Innovationibus inflorescentiisque pube furfuraceo-lepidota cupreo-brunnea incrustatis, serius glabratis. Foliis 15–8 cm. longis, 9–4 cm. latis, ovato-ellipticis vel ovatis, apice acuminatis vel cuspidato-acuminatis, basi rotundatis vel rotundato-cordatis, supra in sicco brunneis, lepidibus sparsis valde persistentibus sub lente acris nempe foveolato-punctatis, subtus lepidibus valde furfuraceis subcontiguus more proprio, indutis, brunneo-cupreatis, firme chartaceis vel subcoriaceis, margine subintegris repandulis, nervis primariis ca. 6–8-jugis late adscendentibus apice saepius ramosis, anastomosantibus obscuris, petiolo 2–5 cm. longo furfuraceo vel lepidoto-tomentello, apice glandulis 2 patelliformibus sessilibus in sinu laminae [=cordatione] sitis ornato. Inflorescentia spicata, 2-sexuali, ad 10–11 cm. longa, axillari terminalique. Floribus ♂: perianthio ca. 6 mm. lato, pedicello ca. 2 mm. longo, lobis ovato-ellipticis ca. 2 mm. longis et

1.5 mm. latis, basi [videtur] glandula acutis, petalis ligulatis ad 3 mm. longis, 0.75–1 mm. latis, staminibus ca. 10, filamentis gracilibus 3–4 mm. longis. Floribus ♂: perianthio 4 mm. lato, 2.5–3 mm. longo, lobis sat crassis, furfuraceo-tomentosis, ca. 2 mm. longis latisque, basi glandula sat magna auctis, margine leviter reduplicativis [scilicet, labiato-subplicatis], petalis nullis; ovario grosse lepidoto-tomentello haud hispido, globuloso-depresso, ca. 3 mm. lato et 2 mm. longo, stylis 3 ad basim liberis, quolibet primum 1 mm. integro, demum in cruribus 2 taeniatis 1 mm. longis diviso: semine ambitu fere quadrangulo, costulato vel costato, ca. 3 mm. longo et 3 mm. crasso, caruncula patelliformi vel potius umbonata hilum totum obtegente, chalaza more proprio minima cicatricosa, arillo brunneo ad chalazam praesertim parcius pallide striato, testa levi, calyce fructu delapso ca. 5 mm. lato, lobis discretis saepius dorso impresso-costatis, pedicello ad 5 mm. longo, columella ad 4 mm. longa.

BRITISH NEW GUINEA: Lower Fly River, east bank opposite Sturt Island, *Brass* 8178 (HOLOTYPE), October 1936, undershrub tree 5 m. high, inland dry ridges of rain-forest; Western Division, Tarara, Wassi Kussa River, *Brass* 8491A, December 1936, common in rain-forest undergrowth, tree 4–5 m. high.

A very distinct species with a seed that closely resembles that of *C. pusilliflorus* Croiz. but is more sharply costate on the back and sides. The chocolate color of the undersurface of the leaf is fully as characteristic as the scurfy-scaly indumentum that gives the leaf this color. The base of the leaf is narrowly and sharply cordate, the glands being set at the inner end of the cordation. The perianth-lobes tend to be reduplicative, as they are in numerous species of the genus, but this tendency is as yet barely marked. A very interesting form, probably related to *C. morobensis* Croiz., but with an altogether different kind of pubescence. Its further affinities are at present unknown.

ARNOLD ARBORETUM,  
HARVARD UNIVERSITY.

NEW SPECIES, VARIETIES AND COMBINATIONS FROM THE  
COLLECTIONS OF THE ARNOLD ARBORETUM

ALFRED REHDER

**Rubus barbatus** Edgeworth in Trans. Linn. Soc. Lond. **20**: 46 [1846], nom. provisor. — Focke in Bibl. Bot. **72**: 39 (1910), pro synonym.

*Rubus nutans* Wallich, Num. List, no. 738 [1829], nom. nud. — G. Don, Gen. Hist. Dichlam. Pl. **2**: 538 (1832). — Edgeworth in Trans. Linn. Soc. Lond. **20**: 45 [1846]. — Walpers, Ann. Bot. Syst. **1**: 276 (1848). — Hooker f. in Bot. Mag. **83**: t. 5023 (1857). — Focke in Bibl. Bot. **72**: 39 (1910). — Non Vest (1824).

Though Edgeworth (l. c.) drew attention to the fact that the name *Rubus nutans* Wallich is invalidated by the earlier name *R. nutans* Vest (in Syll. Pl. Nov. Ratisbon. **1**: 238. 1824) and proposed the new name *R. barbatus* for this species, he nevertheless retained *R. nutans* Wall. and published a description under the latter name. The name *R. barbatus* must therefore be classed as a *nomen provisorium* or *eventuale* and it cannot be considered as validly published. However, as no other name is available for this species, and the application of *R. barbatus* does not leave the slightest doubt, it should be taken up as the valid name for this species.

**Rubus idaeus** var. **strigosus** f. **succineus**, nom. nov.

*Rubus strigosus* var. *albus* Fuller ex Bailey, Cycl. Am. Hort. [4] 1582 (1902).

*Rubus idaeus* var. *aculeatissimus* f. *albus* Fernald in Rhodora, **10**: 50 (1908), non *R. idaeus* 2. *albus* Weston (1770) et *R. i.* var. *albus* Aiton (1789).

*Rubus idaeus* var. *strigosus* f. *albus* Fernald in Rhodora, **21**: 96 (1919), non Weston (1770), nec Aiton (1789).

For the form of *Rubus idaeus* var. *strigosus* (Michx.) Maxim. with amber-white fruit, the name of *succineus* is here proposed referring to the amber-colored fruit, because there is an older subdivision of the same name under *Rubus idaeus* based on a different type, namely "albus" of Weston and Aiton,<sup>1</sup> based on a form with white or yellowish fruits of the European variety of *R. idaeus*, *R. idaeus* var. *vulgatus* Arrhenius.

Even if Weston's name should be rejected as doubtful, since he characterized the variety as "flore albo" which is apparently a slip of the pen for "fructu albo," Aiton's name would stand.

As Dr. L. H. Bailey informs me, a plant of *R. strigosus* var. *albus* was received from A. S. Fuller under that name and specimens of this plant grown at Cornell University collected in 1890, 1891 and 1892, are in the herbarium of Cornell University. Apparently Fuller never published the name himself; it is not mentioned in his "Small fruit culturist," and by Card in his Bush-fruits, p. 318 (1898), it is referred to only as a white variety of *R. strigosus*.

<sup>1</sup> *Rubus Idaeus* 2. *albus* Weston, Bot. Univ. **1**: 256 (1770). — Aiton, Hort. Kew. **2**: 209 (1789) "β." — K. Koch, Hort. Dendr. 113 (1853) "β."

*Rubus idaeus* subsp. *vulgatus* f. *luteofructifer* Schneider, Ill. Handb. Laubh. **1**: 510 (1905).

**Cytisus villosus** Pourret in Mém. Acad. Sci. Toulouse, **3**: 317 (Extr. Chloris Narbon. 21) (1788).

*Cytisus nigricans* sensu Linnaeus, Mant. Pl. **2**: 444 (1771), non Linnaeus (1753).

*Cytisus triflorus* L'Héritier, Stirp. Nov. 184 [1791].—Desfontaines, Fl. Atlant. **2**: 139 [1798].—De Candolle in Lamarck & De Candolle, Fl. Franç. **4**, **2**: 505 (1805).—Reichenbach f., Icon. Fl. Germ. Helv. **22**: 10, t. 2077, fig. i-iii, 1-6 [1867?].—Nyman, Consp. Fl. Eur. Suppl. 84 [1884].—Briquet, Études Cytis. 157 (1894).—Ascherson & Graebner, Syn. Mitteleur. Fl. **6**, **2**: 304 (1907).—Bonnier, Fl. Compl. France Suisse Belg. **3**: 6, t. 121, fig. 629 [1914?].—Non Lamarck (1786).

*Lembotropis triflora* Presl in Abh. Böhm. Ges. Wiss. ser. 5, **3**: 568 (Bot. Bemerk. 138. 1844) (1845).

*Spartocytisus triflorus* Webb in Webb & Berthelot, Phytog. Canar. **2**: 45 in nota [1842].—K. Koch, Dendr. 28 (1869).

*Genista triflora* Rouy & Foucaud, Fl. France, **4**: 208 (1897).

*Cytisus triflorus* L'Hérit. apparently has been accepted so far by all authors as the valid name for this species because the date on the title-page of L'Héritier's work, 1784, was taken as the correct date of publication, or cited as 1784 [-85]. It has been shown, however, by J. Britten in Jour. Bot. **43**: 266 (1905) that the work was published in fascicles of which the last one issued and containing pp. 135-184 did not appear until 1791 (see also Cat. Lib. Brit. Mus. **3**: 1108. 1910). This gives to *C. villosus* Pourr. not only three years' priority over *C. triflorus* L'Hérit., but also makes the latter a later homonym of *C. triflorus* Lamarck of 1786 (in his Encycl. Méth. **2**: 250) which is a synonym of *C. hirsutus* L. (1753). The name *C. villosus* has been used again in 1822 by J. S. & K. B. Presl (in their Deliciae pragenses, 36) for a plant belonging according to Briquet (Études Cytis. Alp. Marit. 173. 1894) to *C. supinus* L. or one of its varieties, but that name does not seem to have been taken by any later author, and anyway being a later homonym is not valid.

**Viburnum Tsangii** (sect. *Odontotinus*), spec. nov.

*Viburnum sempervirens* K. Koch ex Rehder in Sargent, Trees & Shrubs, **2**: 95, t. 145 (1908), p. p., quoad fig. 4-7.

*Viburnum sempervirens* var. *trichophorum* sensu Chun in Sunyatsenia, **4**: 263 (1940), non Handel-Mazzetti (1937).

Frutex 1-3 m. altus, ramulis gracilibus, junioribus satis dense flavide villosis tomento ad tertium annum persistente, quadrangulatis, vetustioribus brunneis; folia persistentia, subcoriacea, elliptica vel obovato-elliptica vel oblonga, rarius ovato-oblonga vel anguste oblonga, 3-7, rarius ad 10 cm. longa, 1.5-4 cm. lata, breviter acuminata vel acuta, basi late cuneata vel interdum rotundata, apicem versus remote paucidentata vel fere integra vel integra, supra glabra, subnitentia, saturate viridia, subtus pallidiora, ad costam satis dense vel sparsius pilosa ad nervos laterales sparsius vel sparse pilosa, ceterum glabra, nervis utrinsecus 4-5, supra impressis, subtus elevatis basalibus robustioribus et longioribus et foliis distincte trinerviis; petioli 3-6 mm. longi, dense villosi. Corymbi 2-4 cm. diam., ramulos elongatos terminantes, subsessiles, rarius pedunculo ad 5 mm. longo suffulti, dense fulvo-villosuli et glandulosi, radiis 4-5, rarius 3; flores albi, fragrantés (fide collectoris) in ramulis secundi vel tertii ordinis, brevissime pedicellati, bractea lineari subglabra ovarium paullulo vel vix superante suffulti; calycis lobi ovati ut ovarium oblongum sparse hirsuti, dimidium



tubum corollae aequantes; corolla 4 mm. diam., glabra, lobis ovato-rotundatis reflexis tubo lato longioribus; stamina erecta, filamentis 2.5–3 mm. longis, antheris ovalibus circ. 1 mm. longis; stylus tubum corollae subaequans, stigmatе punctiformi. Drupae rubrae vel luteo-rubrae et edules (fide collectoris) subglobosae; putamen compressum, suborbiculare, 5–6 mm. diam., apice stylo persistente mucronulatum, ventre profunde concavo, dorso convexum laeve et medio laevissime vel vix sulcatum.

Affinis *V. sempervirenti* K. Koch sed ramulis corymbo petiolis dense villosis, foliis tantum subcoriaceis in sicco non nigricantibus ad costam subtus pilosis, corymbo minore plerumque 3–4-radiato et habitu graciliore facile distinguitur.

TOKIN. Ha-coi, Taai Wong Mo' Shan and vicinity: Tong Fa Market, *W. T. Tsang*, 29571 (TYPE in herbarium Arnold Arboretum, ut cetera specimina citata), Sept. 11–23, 1939 (height 4 ft.; fruit yellowish red, edible); Chan Uk Village near Chuk-phai, *W. T. Tsang*, 28977, May 3–10, 1939 (height 5 ft.; flowers white, fragrant); Shui Mei Village, northeast of Chuk-phai, *W. T. Tsang*, 29281, June 23–30, 1939 (height 5 ft.; fruit reddish-yellow, edible); Chuk-phai, *W. T. Tsang*, 27264, Nov. 18 – Dec. 2, 1936 (height 7 ft.; fruit red, edible). Tien-yen: Kau Nga Shan and vicinity, *W. T. Tsang*, 27432, Dec. 23–29, 1936 (height 5 ft.; fruit red, edible), and 30507, Sept. 23 – Oct. 7, 1940. Da-m-ha: Sai Wong Mo Shan (Sai Vong Mo Leng), Lung Wan Village, *W. T. Tsang*, 29838, 30132, May 18 – July 5, 1940; Sai Wong Mo Shan, Lomg Ngong Village, *W. T. Tsang*, 30229, July 18 – Sept. 9, 1940.

CHINA. Kwangtung: Fang Ch'eng Distr., Na Leung and vicinity, *W. T. Tsang* 26524, July 24–31, 1936 (fruit red, edible); Fang Ch'eng Distr., Kung P'ing Shan and vicinity, *W. T. Tsang* 26646, Aug. 15–24, 1936 (height 5 ft.; fruit reddish black, edible); Kochow Distr., *Tsiang Ying* 2296, May 14, 1929. Kwangsi: Hop Po Distr., *H. Y. Liang* 69354, 69395, June 5, 12, 1937; east of Tung Hing City, *H. Y. Liang* 69460, July 7, 1937 (shrub, 1 m.); Na Pa, Sup Man Ta Shan, *H. Y. Liang* 69532, 69541, July 9, 1937 (shrub, 1–2 m.). Hainan: Bo-ting, *S. K. Lau* 28162, Nov. 9, 1936 (height 3 m., fruit orange); Manning, *S. K. Lau* 28255, Nov. 26, 1936 (height 3 m.). Yunnan: Szemao, s. mountains, alt. 5000 ft. *A. Henry* 12753, 1896–99.

*Viburnum Tsangii* is closely related to *V. sempervirens* K. Koch, from which it differs chiefly in the dense yellowish villous pubescence of the branchlets persisting to the third year, in the pubescent inflorescence and sparingly hairy ovary and calyx, in the villous petioles and the pilose midrib of the underside of the leaves which are less coriaceous and generally smaller; the whole habit of the plant is slenderer. The specimens collected in Kwangsi by *H. Y. Liang* under no. 69395, and 69541 cited above and two other specimens I have not seen, were referred by Chun (l. c.) to *V. sempervirens* var. *trichophorum* Hand.-Mazz., but this variety, of which I have isotypes before me, has a different pubescence consisting on the branchlets of distinct very short fascicled hairs and a short pubescence on the inflorescence, otherwise it has all the characters of typical *V. sempervirens*; it was described by Handel-Mazzetti (in Bot. Centralbl. Beih. 56: 465. 1937) from Chekiang which constitutes the northern limit of the range of *V. sempervirens*; to var. *trichophorum* I have referred *W. T. Tsang* from Kwangtung and *H. H. Chung* 7963 from Fukien which agree also in the comparatively broad mostly elliptic or ovate leaves with the other specimens of this variety. The occurrence of the variety falls within the range of *V. sempervirens* which extends, according to the material in our herbarium from Kwangsi and Hainan, through Kwangtung and Fukien to

Chekiang and east to Kiangsi and southeastern Kweichou (*Cavalerie* 1056 and *Tsiang* 6385). *Viburnum Tsangii* is of more southwestern distribution and ranges from northeastern Tonkin to southern Kwangsi and Kwangtung to Hainan and west to southeastern Yunnan (*Henry* 12753 from Szemao).<sup>1</sup>

***Viburnum Tsangii* f. *xanthocarpum*, forma nov.**

A typo differt drupis luteis.

TONKIN. Tien-yen, Ho Yung Shan and vicinity, *W. T. Tsang* 30742, Oct. 13 – Nov. 22, 1940.

A form with bright, rather light yellow fruits. Forms with yellow or orange-colored fruit have been observed in several red-fruited species; such are: *Viburnum dilatatum* Thunb. f. *xanthocarpum* Rehd., *V. betulifolium* Batal. f. *aurantiacum* Rehd., *V. setigerum* Hance f. *aurantiacum* Rehd., *V. Opulus* f. *xanthocarpum* (Endl.) Rehd., *V. Sargentii* Koehne f. *flavum* Rehd.

***Lonicera Rockii* (sect. *Isika* ser. *Purpurascences*), spec. nov.**

Frutex 0.60–1 m. altus, glaber, ramosus, ramulis annotinis epidermate brunneo in laminas deciduas solubili et partim delapso et ad nodos petiorum bases dilatatas persistentes gerentibus, vetustioribus cortice cinereo fibroso obtectis; gemmae circiter 3 mm. longae, squamis 2 exterioribus carinatis acutiusculis interioribus evolutis majoribus late ovalibus subfoliaceis. Folia nondum perfecte evoluta, ovalia, obtusiuscula, circa 1 cm. longa, glabra vel interdum subtus ad costam sparse glandulosa, brevipetiolata. Flores coetani, plerumque 2 vel 4 paria in ramulis valde abbreviatis simul cum foliis immaturis congestis e gemmis axillaribus orientibus, bini in pedunculo brevissimo, bracteis 2 ovatis vel oblongo-ovatis 6–7 mm. longis obtusiusculis basi attenuatis suffulti; ovaria ad apicem connata, subglobosa, 2 mm. alta, trilocularia loculis pluri-ovulatis; calyx cupularis, irregulariter crenato-dentatus, 0.5–0.7 mm. altus; corolla anguste infundibuliformis circa 1 cm. longa, basi saccata, extus glabra lutea (fide collectoris), tubo intus piloso triente superiore excepto, lobis 5 suborbicularibus vix 2 mm. longis suberectis; stamina 5, antheris oblongis 2 mm. longis quam filamentis glabris paullo longioribus et limbum subaequantibus; stylus lobos paullo superans, basi sparse pilosa excepta glaber. Fructus non visus.

Affinis *L. saccatae* Rehder, sed differt praecipue glabritie, foliis ovalibus, pedunculis brevissimis, bracteis latioribus et corolla lutea.

CHINA. Yunnan: Mount Peimashan, Mekong-Yangtze divide between Aduntze and Pungtzer, *J. F. Rock* 9246, in 1923 (HOLOTYPE in herb. Arnold Arb.) shrub 2–3 ft., flowers yellow).

This new species seems to be related to *L. saccata* Rehd. and particularly to its var. *Wilsoni* Rehd., but is easily distinguished by its glabrousness, its small oval leaves, smaller nearly sessile yellowish flowers with broader ovate to oblong-ovate bracts. The flowers appear with the leaves in the axillary clusters of small crowded leaves along last year's branches and are often partly hidden by the not yet fully developed leaves; their color is given as yellow by the collector, but I suppose it is nearer yellowish or yellowish

<sup>1</sup> *Henry* 12753 I had cited in 1908 (l. c.) under *V. sempervirens* with the remark that it differs from the typical form in its pubescence and referred again to it under that species in 1935 (in *Jour. Arnold Arb.* 16: 331).



white as in some other species of this series as *L. obovata* Royle, *L. microphylla* Willd. and *L. canadensis* Marsh. In general appearance at flowering time, the species resembles more some glabrous forms of *L. coerulea* L. and *L. cyanocarpa* Franch. than *L. saccata*.

*Lonicera oreodoxa* H. Smith in herb., spec. nov. (sect. *Isika* ser. *Bracteatae*.)

Frutex humillimus, circ. 10 cm. altus ramis tenuibus pilosis pilis per plures annos persistentibus; gemmae ovoideae, 1.5–2 mm. longae, perulis 2 exterioribus, interioribus accrescentibus scariosis rubescentibus. Folia ovalia vel ovato-ovalia, 6–12 mm. longa et 4–9 mm. lata, obtusa vel acutiuscula basi rotundata, supra sparse longe pilosa, subtus satis dense praecipue ad costam nervosque longe accumbenti-pilosa, 2–3-nervia nervis adscendentibus subtus ut costa elevatis, supra obsoletis et costa basin versus leviter impressa; petioli 1–2 mm. longi, pilosi. Flores axillares e basi ramulorum hornotinorum orientes, plerumque par unum pro quoque ramulo, bini in pedunculo gracili laxe piloso 10–12 mm. longo; bracteae late ovatae acutiusculae margine irregulariter subdentatae et piloso-ciliatae, nervosae, 1 cm. longae, extus pilosae, intus sparsius breviter pilosae, piloso-ciliatae, ovaria et basim corollae obtegentes; bracteolae nullae; ovaria distincta, ovoidea, 2 mm. longa, glabra, calyce 5-dentata dentibus late ovatis 1.5 mm. longis ciliatis coronata; corolla 2–2.5 cm. longa tubuloso-infundibuliformis, basi saccata, apicem versus sensim dilatata, limbo subpatente circ. 2 cm. lato, extus sparse glandulosa et sparsissime praesertim ad lobos pilosa, lobis orbiculari-ovatis 6–7 mm. latis, tubo intus piloso triente superiore excepto; stamina 5, antheris exsertis et quam corollae lobis paullo brevioribus anguste oblongis, filamentis 4 mm. longis glabris paullo infra faucem insertis; stylus staminibus aequilongus infra medium longe pilosus. Fructus non visus.

Affinis videtur *L. finitimae* W. W. Sm. sed pube piloso non setoso, foliis minoribus subtus satis dense pilosis, calycis dentibus distinctis, corollae lobis latioribus stylo infra medium longe et satis dense piloso, statura humillima differt.

CHINA. Northern Szechuan: Dongnergo in alpineto 4700–4800 m. alt., July 21, 1922, *Harry Smith*, 3349 (in herb. Upsala et in herb. Arnold Arb.) "frutex humillimas ad 1 dm. altus."

A very distinct species belonging to ser. *Bracteatae* and apparently nearer to *L. finitima* W. W. Sm. than to any other species of this series, but the latter differs markedly in the setose not pilose pubescence, in the larger leaves setose above and on the veins beneath, larger winter-buds, the nearly obsolete calyx-teeth, the oblong-ovate corolla-lobes and the glabrous style. *Lonicera oreodoxa* is remarkable for its low stature, being a densely branched shrub only about 10 cm. high, and for the small size of the leaves hardly exceeding 1 cm. and the comparatively large flowers; it must be quite showy in bloom which probably induced Dr. H. Smith to bestow upon it the specific epithet "*oreodoxa*." I saw this species first in 1928 in the herbarium of Upsala, when Dr. H. Smith kindly gave me a duplicate of it for the Arnold Arboretum.

